Research Paper

A Comparative Analysis of Capital Efficiency between Bakery and Dairy Based Enterprises Found in Prayagraj District

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Abstract—The study is based on the small-scale manufacturing industry while selecting bakery and dairy product manufacturing firms from the Prayagraj district. An inter-industrial comparison is made in terms of capital employed and capital intensity in the production to determine the magnitude of capital efficiency in these industries. The concerned food processing firms are analysed and evaluated by focusing on key factors such as variable cost, fixed cost and capital-output ratio. The results show that a lower amount of capital is required for setting up a dairy processing plant and operating on a small scale. On the other hand, bakery firms are capital-intensive but fail to use capital effectively, thus generating a lower amount of sales revenue relative to the amount of input used up. While considering the limited sources of finance in the region and the presence of surplus labourers as well as growing consumer demand, dairy production is a much more desirable mode of occupation. The efficiency of capital could be raised in small firms through imparting proper knowledge and training to workers.

I. INTRODUCTION

Small-scale industries play an important role in economic development in India. As noted in the 1956 Industrial Policy Resolution, small-scale enterprises provide immediate and large-scale employment in the economy. Their establishment leads to a more equitable distribution of income in society. They enable effective mobilization of savings and skilled workers towards the secondary sector, which might not otherwise be used. As compared to large industries that require highly skilled workers, small industries provide employment to semi-skilled and even unskilled workers. The capital requirements to start and operate a small firm are very low in comparison to large and medium-sized firms. Therefore, it is desirable to establish small-scale industries in India, where there is a shortage of capital for investment purposes. Moreover, they require simple, locally available machinery and equipment with a shorter gestation period [1]. The capital structure of a food processing firm consists of its investments in fixed asset that are employed for longer terms, such as plants, buildings, and equipment, as well as current asset, which include short-term asset such as cash & bank balances, stock in hand, and account receivables. During the period of economic reform in India, the rate of substitution between production factors has increased for non-neutral technological changes in production functions. Therefore, MSMEs have undergone capital-intensive development. Moreover, the changes in the capital labour ratio have a positive impact on the marginal productivity of

the reformed factors. As a result, MSMEs have become much more interdependent in terms of capital investment and capital intensity [2]. In the context of the growing importance of the food processing industry in the Indian economy, the study attempted to examine the capital structure of bakery and dairy products manufacturing-based firms in a capital-deficient region of eastern Uttar Pradesh, i.e., Prayagraj. The research question related to the efficiency of capital is measured by comparing the capital-output ratio of both industries. The paper also made suggestions to improve capital productivity with the help of skill development and training programs for workers.

The paper consists of five sections, under which section I contains the introduction of the research article and section II contains related works describing the importance of an optimal capital structure. Section III describes the methodology used in the collection of data and further analysis made. Section IV discusses the results obtained with the help of tables, charts, and diagrams. Section V concludes the article while mentioning future scope to increase capital productivity.

II. RELATED WORK

The majority of micro enterprises maintain liquid asset costing between 20 and 40 lacs, whereas small enterprises have around 40 lacs to 60 lacs of investment in current asset. However, micro enterprises invest between 40% and 60% of their total funds to finance their working capital, whereas small enterprises invest between 20% and 40% for

the same purpose. Most micro enterprises use bank overdraft facilities to finance their working capital requirements. On the other hand, small enterprises use both overdrafts and loan facilities [3]. MSMEs require an optimal capital structure in order to increase profitability while lowering capital costs. A heavy debt burden puts owners at financial risk, which reduces the return on equity as interest payment obligations increase. A company can maintain a well-organized capital structure through financial re-engineering, which is vital for survival and expansion [4]. A firm's leverage is strongly and negatively related to its working capital requirements. The major explanation is that as the ratio of debt to asset increases, the firm's focus shifts towards the management of capital efficiency in order to clear the capital amount blocked in accounts receivable and inventory. Thus, firms with an increasing debt to asset ratio require less working capital [5]. On comparing the capital intensity (capital-to-labour ratio), it is observed that the larger firms are almost 12 times more capital intensive than small scale units. This shows that capital intensity and firm size are positively correlated. Low capital productivity is found in small industries related to motor vehicles, electrical equipment, machinery, and food product manufacturing. As a result of the employment of surplus workers, a declining trend in capital productivity is observed with rising capital intensity in these sectors. Therefore, the increase in capital intensity while improving the capital productivity in larger firms has not been caused by technological upgradation but rather by the replacement of workers in these sectors [6]. The fixed asset structure is significant for borrowing requirements as it shows the value of collateral security to the proposed lender. Empirical analysis also shows that mature small and medium enterprises (SMEs) have higher credit ratings in the market and therefore have a better reputation, which helps them in gaining credibility for their business. In consideration of the proposition that firm size is inversely related to leverage , SMEs need more debt for investment purposes related to growth and expansion of plants [7].

III. METHODOLOGY

The pace of economic development and population expansion in the district of Prayagraj has witnessed a large number of food product manufacturing firms multiplying every year. Therefore, in order to gather in-depth knowledge of the capital structure, a primary survey is carried out on a few related small-scale units with annual sales revenues of less than or equal to 5 crores. Six bakery (6) and three dairy (3) based manufacturing firms are chosen using purposive and convenience sampling methods. Data on total fixed asset investments and monthly variable cost expenditures are collected. The working capital requirements are analyzed with respect to various heads under variable cost. The one way ANOVA method is used to understand the difference between these two industries in terms of variable cost constituents. Furthermore, to bring out the extent of capital efficiency in these firms, the capital-output ratio is calculated. Tables,

diagrams are used for the inter-comparison and summarization of particulars.

IV. RESULTS AND DISCUSSION

Table 1. Working capital requirements or Variable cost incurred (in lacs) per month.

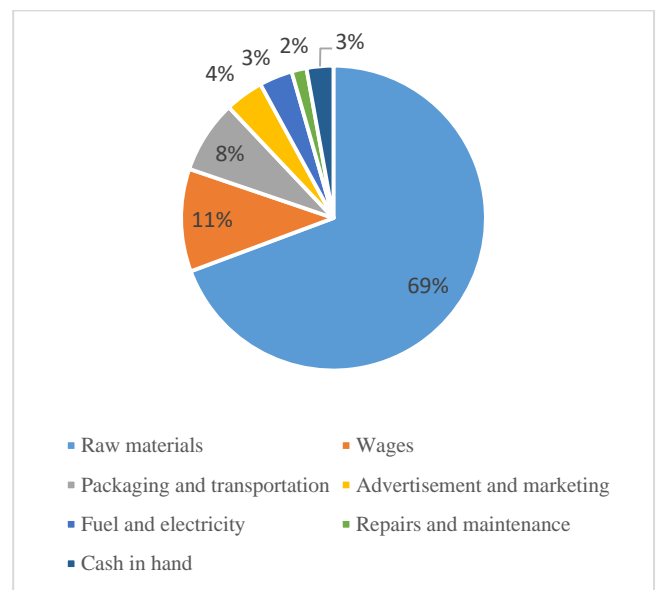| Food Processing Industry	Raw materials	Wages	Packaging and transportation	Advertisement and marketing	Fuel and electricity	Repairs and maintenance	Cash in hand	Total
Bakery products	6.10	0.96	0.68	0.36	0.31	0.14	0.25	8.80
Dairy products	9.52	0.74	0.52	0.65	0.96	0.17	0.35	12.91

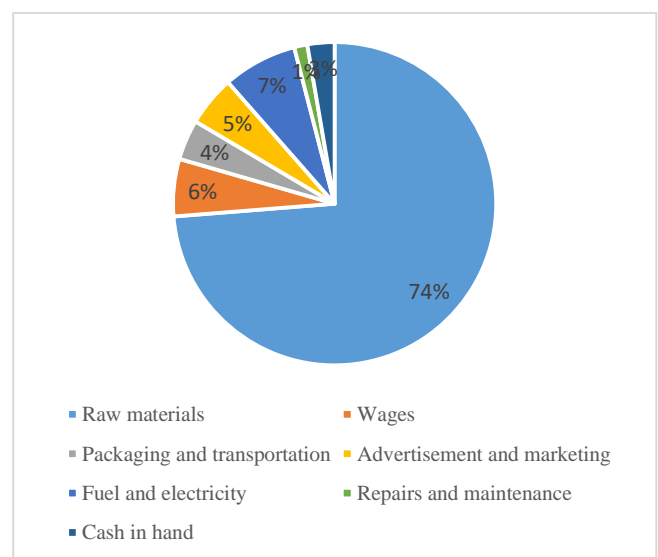Figure 1. Variable cost incurred in Bakery products industry (percentage-wise).

Figure 2. Variable cost incurred in Dairy products industry (percentage-wise).

The uninterrupted cash flow in the form of working capital is necessary for a firm to ensure its survival. But the capital efficiency which is equally important in a firm is obtained through the relative performance and productivity of the inputs supplied for manufacturing the desired product. According to the amount of variable costs recorded for the aforementioned food processing industries under various headings, raw materials account for approximately 70% of the total variable costs. For the reason behind the presence of organized mode employment and the majority of permanent workers, the proportion of wages paid in bakery firms is comparatively higher (11 percent).The bakery industry has a higher percentage of packaging costs (8%) because various items such as bread, cakes, biscuits, snacks, candies, require attractive and convenient packaging. In the case of dairy processing and production, the share of expenditure on fuel and electricity is more than double (7%) that of bakery firms (3%). The heavy machinery such as the homogenizer, separator, pasteurizer, and deep freezer consume a large amount of energy to run at full capacity. However, because refrigerated vehicles are not found in small-scale industrial units, the portion of transportation costs in total expenditure is low in dairy firms (4 percent). A one way ANOVA test is carried out to be familiar with the significant difference between these industries with respect to the variable cost.

Table 2(a). Sum of squares with respect to the variable costs shown in table 1.

Bakery products industry	6.1	0.96	0.68	0.36	0.31	0.14	0.25	8.8
Sum of squares	37.21	0.9216	0.4624	0.1296	0.0961	0.0196	0.0625	38.9018
Dairy products industry	9.52	0.74	0.52	0.65	0.96	0.17	0.35	12.91
Sum of squares	90.6304	0.5476	0.2704	0.4225	0.9216	0.0289	0.1225	92.9439

T (All individual values of n items) = 8.8 + 12.91 = 21.71

Total SS $= \sum x^2_{ij} - (T)^2/n$

$= 38.9018 + 92.9439 - (21.71)^2/14$

$= 131.8457 - 33.66601$

$= 98.17969$

Table 2(b). Sum of squares (bakery and dairy products industries on aggregate).

T_j	15.62	1.7	1.2	1.01	1.27	0.31	0.6	21.71
T^2	243.9844	2.89	1.44	1.0201	1.6129	0.0961	0.36	251.4035
$(T)^2/n$	121.9922	1.445	0.72	0.51005	0.80645	0.04805	0.18	125.7018

SS between $= \sum (T_j)^2/n_j - (T)^2/n$

$= 125.7018 - 33.66601$

$= 92.03574$

SS within $= \sum x^2_{ij} - \sum (T_j)^2/n_j$

$= 131.8457 - 125.7018$

$= 6.14395$

Table 3. ANOVA table.

Source of variation	Degree of freedom	Sum of Squares	Mean Sum of Squares	F-ratio	F critical value (at 5%)
Between samples	(7-1)=6	92.03574	15.33929	15.33929/0.877707 = 17.47655	Fc(6,7) =3.87
Within samples	(14-7) = 7	6.14395	0.877707		
Total	(14-1) = 13	98.17969			

As the computed value (17.47655) is higher than the critical value (3.87), we inferred that there is a significant difference in the cost of variable inputs between bakery and dairy firms. The variable cost is positively correlated with the requirements for working capital. The result indicates that the operational expenses of bakery firms are higher than those incurred by dairy firms. Therefore, bakery firms need to generate enough revenue while utilising capital effectively and judiciously to compete with the profitability accrued to dairy firms. Furthermore, from the establishment point of view, the amount of fixed asset under well-defined categories is to be analysed to know the quantum of capital invested in these firms.

Table 4. Total amount of fixed asset (in lacs).

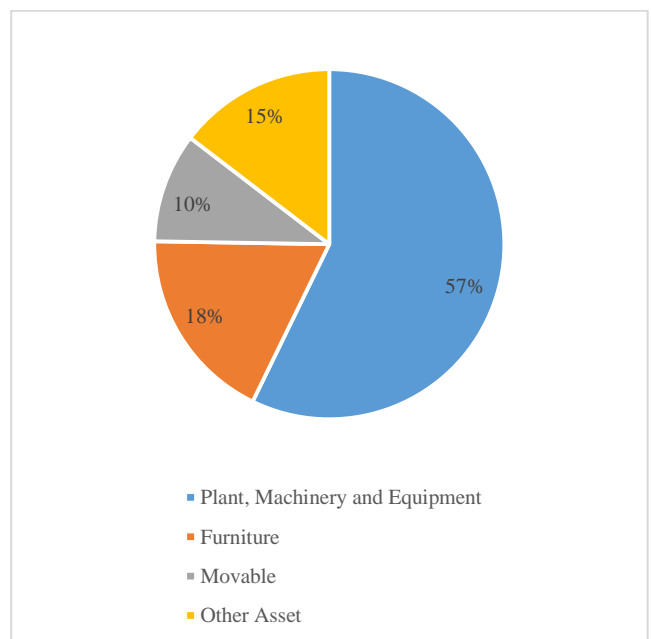| Food Processing Industry (Number of Units)	Plant, Machinery and Equipment	Furniture	Movable	Other Asset	Total
Bakery products (6)	279.63	88.21	49.50	71.38	488.72
	Average fixed asset cost				
	46.605	14.702	8.25	11.897	81.45333
Dairy products (3)	120.45	11.94	18.48	8.65	159.52
	Average fixed asset cost				
	40.15	3.98	6.16	2.883	53.17333

Figure 3. Classification and partition of fixed asset in Bakery products industry (percentage-wise).
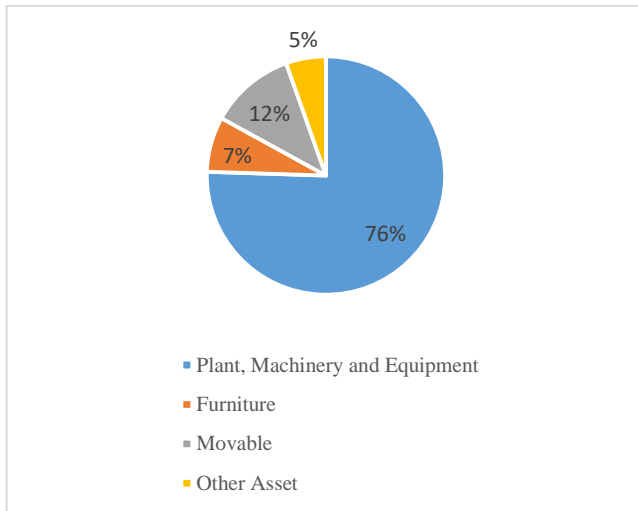
Figure 4. Classification and partition of fixed asset in Bakery products industry (percentage-wise).

The total outlay of fixed asset in dairy firms on average is much lower than in bakery firms on the same scale. At dairy processing firms, the plant and machinery constitute more than 2/3rd of the total investment, whereas, on the other hand, the machines and equipment used in bakery plants account for a little more than half of the total fixed asset. For the reason that bakery products need more advertising and marketing, the share percentages of furniture (18 percent) and other asset (15 percent) are much higher than those found in dairy firms under similar heads.

Table 5. Total sales revenue (in lacs).

Time period	Bakery products	Dairy products
Per month	12.083	15.867
Per year	145	190.40

The ever increasing demand for milk and dairy products is clearly visible while considering their higher sales revenue in comparison to the sales revenue generated from bakery products. There is a remarkable difference between the average sales revenue generated from both industries. The most pronounced reason behind such a skewed distribution is found in the benefits and diverse utility of milk. The greater awareness of consumers towards health and hygiene is the driving factor behind choosing dairy products. The bakery products available on the market are considered non-essential and supplementary food items. These are the phenomena behind such divergences in the sales revenue.

Table 6. Capital-output ratio.

	Variables	Bakery products	Dairy products
(1)	Total average fixed asset cost	81.45333	53.17333
(2)	Total Sales revenue (in lacs)	145	190.40
(3)	(1) ÷ (2)	0.561747	0.279272

Discussion

The above statistical calculations and inferences support the research hypothesis that the capital-output ratio of bakery firms is higher than dairy firms. Both fixed and variable input demands in bakery firms are significantly higher than in dairy firms in relation to total sales revenue. This implies the fact that the bakery industry is capital-intensive whereas the dairy industry is labour-intensive. In another case, workers involved in milk processing have significantly higher labour productivity than workers involved in bakery product manufacturing. The existence of low-skilled manual operations is most commonly observed in both kinds of industries. Owing to the occupational hierarchy, dairying is found to be complimentary with farming in the region. Milk itself is the major input that is locally available at a reasonable cost and is further processed. Therefore, native people have informal knowledge about the processing methods related to pasteurization, separation, and homogenization. On the other hand, activities related to wheat, sugar, and egg processing are mostly learned. The dairy industry has the capacity to absorb the surplus manpower found in the region at lower wages, thus reducing the variable cost. It is also observed that in-job training is much simpler and easier in the dairy industry in contrast to the bakery industry.

V. CONCLUSION AND FUTURE SCOPE

The requirement for capital is the most decisive factor in the setup of a small-scale manufacturing plant. The study provides conceptual clarity regarding the basic structure of a firm in terms of input used in both fixed and variable forms, as well as sales revenue generated. The comparison of the capital-output ratio favoured the results towards the dairy processing industry on the basis of low cost input, better productivity, and higher sales revenue. Capital efficiency is negatively affected when the final output does not give proper returns on the amount of capital invested. The other side of the study reveals that the composition and demand of the manufactured products are the major determinants behind the capital efficiency of a particular industry. Government policies on MSMEs development should aim to develop workers' skills to increase their productivity. MSMEs should receive incentives and financial support to encourage labour-intensive technologies in their production processes so as to achieve efficiency in the utilisation of scare capital. Moreover, larger companies need to be participative in technology sharing and knowledge upgrading, which could increase the capital productivity of small-scale industries. The reformation in the indirect tax structure could increase the demand for agro-based products in the market.

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