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PLANNING AND PERFORMANCE: EXPLORATORY FINDINGS FROM SMALL AND MEDIUM RUBBER AND PLASTIC SECTOR FIRMS

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Abstract— This paper links SME performance, with the use of planning and demographics of key person. A model and research frame work has been developed to study the linkage between dependent (SME performance) and independent (use of planning) variables. Structured questionnaire schedule is developed, based on previous research works in this area. A survey is conducted among the representative firms (SMEs in rubber and plastic sector). Statistical test using SPSS and AMOS is conducted and the results are interpreted. Univariate and multivariate tests are used to test the hypotheses formed. Planning, standardization and IT usage by the firms are significantly influencing firm performance. The paper highlights the importance of planning to better the firm performance. For the SMEs to come fourth and to survive in this highly competitive and globalized environment, specific competencies of planning and IT usage are to be attained.

Keywords- *Planning, Standardization, Firm performance, Small and Medium Enterprises*.

I. INTRODUCTION

The Small and Medium Enterprises Sector plays a vital role in the economic development of the country. This sector contributes 45% of the Industrial production, 40% of Exports and it forms part of about 95% of the total industrial units in the country [1]. Some of the major challenges faced by SMEs include lack of access to finance, low R&D investment, lack of access to technology, improper planning process lack of product innovation, inadequate marketing support in an increasingly competitive environment, etc.

II. OBJECTIVE OF THE PAPER

The paper aims at exploring the relation between the use of planning and performance of the firm. It is intended to identify the factors contributing to firm performance and to quantify the extent of involvement. A model is proposed to show the link between dependent (Firm performance) and independent (use of planning) variables. Indicators are selected for measuring the use of planning and firm performance. With suitable statistical tests the relationship has been established and the associated hypothesis has been verified.

III. LITERATURE REVIEW

A. Planning in Small and Medium Firms

Newman and Sridharan [2] contend that the ineffective deployment of strategic planning in many firms is the main reason for the failure to achieve expected or projected performance. Use of planning in SMEs is reported to be poor because of negligence by owners and reliance on the rule of thumb [1], [3]). Many SMEs plan intuitively and planning instruments are not being used in most of the cases [4] [5]. It is established that the SMEs engaged in strategic planning are more likely to achieve higher sales growth, higher returns on assets, higher margin on profits and employee growth [6]. Alasadi [7] studied the SMEs in Syria and shown that formalization of strategic planning is positively correlated with firm performance.

Researchers focused attention to link the demographics of SME key person with performance. Educated key persons (formal and business education) are more likely to be open minded and it enhances managerial capabilities, knowledge utilization and firm performance [8], [9]; [10]). Piercy *et al.* [11] established the positive link between experience and sales growth. Bhutta *et al.* [12] empirically verified the positive correlation between computer usage and small firm performance. Procedures of standardization and certification process resulted in improved management control, improved customer service and product quality [13].

B. Model Proposed in This Work

We used firm performance as dependent variable and use of planning, standardization and demographic characteristics such as age, education and experience of the key person as independent variable. The dependent variable (use of planning) was measured with the help of four indicators reflecting the degree of formalization in planning, use of budgetary planning, satisfaction level of planning and accuracy of planning. Independent variable (firm performance) was measured by four indicators namely sales, target achievement, profitability and on-time delivery. The model used in this study is shown in figure 1.

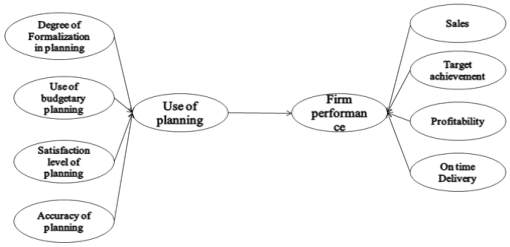

Figure1. Model, linking Use of Planning and Performance

IV. METHODOLOGY USED IN THE STUDY

Data was collected by means of structured questionnaire survey. Questions were framed, after reviewing the previous works and from the opinion of the experts. Pilot study was conducted among 10 industries and thus the data reliability was verified. List of firms, taken for the survey were collected from the data base of rubber board. Out of the 214 firms, data from 118 were used for the study.

A. Survey Instrument and Selection of Indicators

The questionnaire included three parts. The first part dealt with the basic and demographic information about the firm such as the name, type of production, ownership, age, experience and education of key personnel, etc. Second part was connected with the measurement of firm performance and the third part consisted of the questions related to use of planning followed by the firm. Most of the questions were of multiple option type and were measured on five point Likert's scale. Respondents were asked to indicate their response ranging from Low to High or very poor to very good type. Items were coded to a range with lowest score of value 1 and highest score of 5. Indicators were selected from the previous works.

The indicators used for measuring firm performance were: Sales performance [12], [14], Growth plan by the firm [12]; [15]), Target achievement [16]; White [17]; [3]), Profit levels met by the firm [18]), Delivery promptness [3]). Sales performance was included because it is the drive for operating the firm and SMEs are managing by re circulating the money during the business cycle. Growth orientation was considered as a measure of SME growth [19]; [20]; [12]. Target achievement and prompt delivery reflected the firm's ability to implement the production planning function. Profit levels indicate the overall performance and stability. For analysis overall firm performance was dichotomized in group 0 (below performing) and group 1 (above performing). Use of planning was assessed by indicators such as degree of planning formalization [7], Satisfaction level and accuracy of planning [21], use of planning instruments such as budgetary planning [12]; [5]. Use of standardization was explored using an open ended question.

B. Data Collection

SME based research works reported the applicability of self reported type questionnaire as a diagnostic tool [22]; [23]; Sharma [24]; [16]. The sampling frame consisted of SMEs in rubber and plastic sector in Kottayam district of Kerala State. The lists of firms were collected from Rubber Board of India and from Small Industries Development Corporation (SIDCO).The list included 214 firms. Out of which 118 data were included in the analysis (because out of the 214 firms some are inoperative and some are reluctant to give the data). In order to ensure the homogeneity of data, a cluster cum convenience sampling was used. Changacherry and Poovanthuruthu industrial segments were identified for data collection. Hair *et al*. [25] recommended a sample size of 15 per factor for conducting factor analysis. Based on the total number of indicators used in the analysis, this sample size of 118 was found acceptable. Characteristics of the sample were shown in figure 1.

TABLE 1.
CHARACTERISTICS OF SMES SURVEYED

CEO	Owner	79	Key person's experience	4-7yrs	5
	Manager	28		8-10yrs	44
	Entrepreneur	11		9-15yrs	58
ISO	With ISO	14		>15yrs	11
	Without ISO	104	Key person's age	>30 yrs	1
Key person's education	School	17		30-40	23
	Pre-degree	46		40-50	47
	Graduate	47		50-60	13
	(Engg & MBA)	8		60<	34

C. Hypotheses Formulated

In order to test the relation between the dependent and independent variables following hypothesis are formulated. All hypotheses are expressed in the null form.

1) H1a: Firm performance is no way influenced by the use of planning by the firm
2) H1b: There is no difference among the use of planning between the firms run by entrepreneurs and conventional owners/managers
3) H1c: Use of planning is no way influenced by the education of the key personnel
4) H1d: There is no difference among the use of planning between ISO and non ISO firms
5) H2: Standardization followed in the firm is not influencing the SME performance.

V. DATA ANALYSIS AND DISCUSSION

Cronbach's alpha value (shown in table 2) is a measure of reliability and is calculated. Alpha values are found to be good for firm performance indicators and planning indicators (alpha value above .7 is considered to be good).

TABLE 2.
RELIABILITY ANLAYSIS

Component	Cronbach's alpha
Firm performance	.803
Use of planning	.714

Normality was tested using normality plots and Kolmogorov-Smirnov test. It was found that the data collected does not follow normal distribution. Since the data was not normal, non-parametric test such as spearman correlation and Kruskal walli's test were used for analysis.

Factor analysis reduced the data with minimum distortion. Common factors were extracted with eigen values greater than 1, as per the principal component analysis. A varimax rotation was used to enhance the factor loadings within each common factor and a simplified factor structure was established (shown in table 3.).

TABLE 3.
RELIABILITY AND SAMPLE ADEQUACY TEST RESULTS

Variables	Factors	Communalities	Item-Total correlation	Cronbach's alpha
Firm Performance	Growth opportunities	.734	.433	.799
	Target achievement	.949	.814	.708
	Profitability of the firm	.907	.694	.729
	On time delivery	.709	.490	.764
Use of planning	Degree of formalization in planning	.756	.576	.753
	Use of budgetary planning	.608	.261	.792
	Satisfaction	.794	.468	.765
	Accuracy of planning	.770	.384	.777

Item to item correlations nearing .3 indicated the Unidimensionality of constructs. Item to total correlation values were all significant and below .8 indicating no redundancy. K-M-O criteria of sample adequacy (above .8) and Bartlett's test of sphericity (significant at 5% level) were fulfilled. Communalities explain the total amount of variance shared by the root variables (firm performance and use of planning) shared with the respective indicators. Here the higher communality values (above .5) explained good variance. Item–total correlation and Cronbach's alpha values of reliability for each factor was found good. Hence convergent validity of the constructs are established.

A. Univariate Analysis

Kolmogorov-Smirnov test indicated significant variation from normality and therefore we used Kruskal-Wallis chi square test (non parametric test) for testing the difference between samples. Test results are shown in table 4.

TABLE 4.
HYPOTHESIS TESTING USING KRUSKAL WAALLIS TSET

Control Variable	Kruskal-Wallis Chi - square	Significance	Inference
Below and above level performers of "Use of Planning" with TFP	5.874	.015	Reject Hypothesis(H1a)
Below and above level users of standardization with TFP	1.195	.274 (NS)	Accept Hypothesis(H2)
Use of planning between firms run by entrepreneurs and owners	2.284	.131 (NS)	Accept Hypothesis(H1b)
Below and above educated key persons use of planning	1.710	.191 (NS)	Accept Hypothesis(H1c)
Below and above level users of standardization and use of planning	9.323	.002	Reject hypothesis (H1d)

For the analysis, the dependent variable is grouped in two head, namely above and below level. Positive correlation was found between "use of planning" and "firm performance" (.362) and the Kruskal Wallis test indicated that the firm performance was influenced by use of planning. Thus the hypothesis H1a was rejected. Out of the 118 respondent firms, it was found that 108 are not following any type of standardization practices. Kruskal Wallis test indicated that the firm performance was not influenced by the use of standardization practices and hence the hypothesis H2 was accepted. Hypothesis (H1c) showing no difference in the use of planning (indicated by the scores) between the firms run by less and highly educated key person was accepted. It is inferred that education of key personnel is not a factor that influence the use of planning in firms. This finding is in contradiction with other research findings [21], [22]. Hypothesis H1d is rejected, which indicates more use of planning is in firms that follow standardized practices such as ISO.

B. Multivariate Analysis

We used Logistic regression to test the combined effect of independent variables on SME performance. Below and above level performing firms were classified as a function of use of planning and other demographic variables. The Wald's statistic evaluated the interrelations among the variables. The maximum likelihood ratio, Hosmer and Lemeshow measure, and classification table of predicted and observed figures were used to test the regression model. Pseudo R^2 of Cox and Snell and the R^2 of Nagelkerke were used to evaluate the overall fit [25].

TABLE 5.
RESULT OF LOGISTIC REGRESSION

Independent variables	B	SE	Wald	Sig.	Exp(B)
Use of planning	1.510	.485	9.710	.002	4.529
Education of key	.789	.273	8.359	.004	2.201
Constant	-5.21	1.551	11.290	.001	.005

*Notes: In Step 1, use of planning was entered; step 2 entered education of key personnel. Dependent variable (Dummy): Firm performance; below performers = 0; above performers = 1. Logistic coefficients (B) were used to measure the changes in the ratio of probabilities, termed as odds ratio. Positive values of B increase the predictive probability. SE; standard error. Wald: a statistic known as Wald statistic. Exp (B): exponent of B.

Model fit is statistically assed by means of global fit measure of Hosmer and Lemeshow, in which the obtained value indicate the statistically significant difference between the observed and predicted classifications [25].

Firm performance is expressed as a function of use of planning and education level of key personnel. Exponents of the coefficients were calculated as e^B = 4.529 for planning and e^B = 2.201 for education. Positive value of B (1.510 for planning and 0.789 for education) show that there is positive association between firm performance and education. For 100 percent change in use of planning, firm performance is increased by 452.9 percent and for 100 percent change in education, firm performance is changed by 2.201 percent. Other indicators such as age and experience of key person and standardization were not included in the regression equation. Hence it was inferred that age and standardization are not influencing firm performance.

VI. CASE STUDY

Average scores of the indicators of the use of planning are shown in figure 2. All the use indicators, except the one, "use of budgetary planning" show the above satisfactory level values. Use of budgetary planning is less than 3 (the minimum threshold value indicate positive measure), which mean the use of planning instruments are not adequate. This is indicative of the fact that the firms (SMEs of the rubber and plastic sector) are managing with crude rules of thumb. Practice of planning instruments is to be enhanced. This is a compelling requirement to overcome the threats of globalization and challenge faced by the SMEs in the export oriented market. Budgetary planning with proper planning instruments will lead the firm with a realistic and accurate perspective.

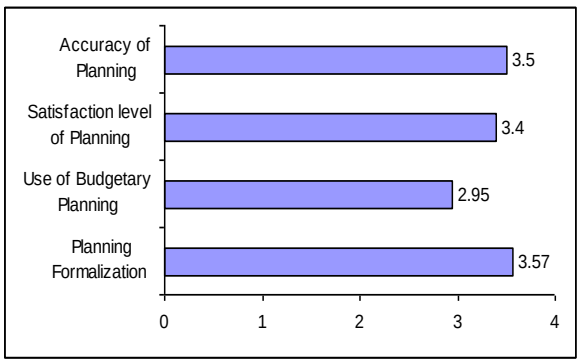

Figure 2. Average Scores of the Use of Planning

Case study of first firm reveals the features of a better performing firm. This firm is a SME involved in the manufacture of PVC Pipes and fittings and is a proprietary firm managed by a professionally managed team under a General Manager as the key person. The firm is ISO certified and is having total workers strength of 72. The organization structure is flat with 6 levels. The firm is aware of modern PPC techniques and uses some of them on routine basis. Scores of planning, controlling and firm performance for the firm A used for the case study are shown in figure 3.

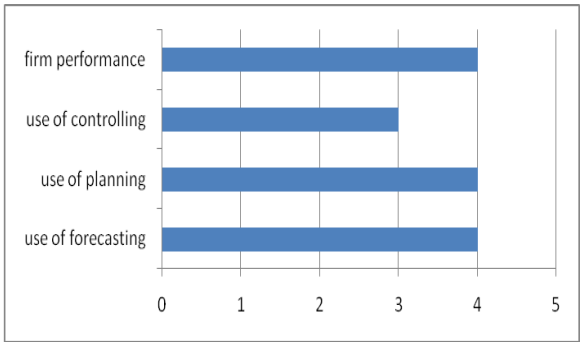

Figure 3. Scores of Planning and Firm Performance (Firm A)

From the classification table of Logistic regression, this firm is classified into the above performing group and demographic variables such as standardization, education, experience and use of PPC are correlated with firm performance. Seasonality is found as most influencing component other than trend and cyclic elements. Firm is using computers for production, forecasting, planning, accounting and information processing. Owner includes people from all departments for participative planning and appreciable level of internal and external training is provided by the firm (as reported in the questionnaire response). Still the use of PPC elements to compete in the export or globalized market is not adequate. To develop alternatives for managing the production planning and control function, following procedure is recommended:

1) To avail the service of a consultant or gain exposure to have the right (best suited) demand forecasting method).
2) To develop an inventory information system for the effective planning of materials and in process items. This system is required to manage the fluctuations in raw material availability and demand uncertainty.
3) To utilize IT and learning for the development and maintenance of planning and scheduling system, that integrates forecasting, planning and controlling for the best performance.

VII. CONCLUDING REMARKS

It is concluded that the use of planning and education of the key personnel influence the SME performance. From the univariate and multivariate analysis conducted it is inferred that the factors such as age, experience and standardization practices followed does not have any significant influence. Even though the formal planning procedures and planning instrument helps the SMEs to increase their performance, the same is not followed by most of the firms. Instead they are using thumb rules and their experience in planning production and other activities with the aim of reducing the expenses incurred. But to survive in a highly turbulent and competitive market

the SMEs have to adopt formalization and standardization practices.

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