EFFECTS OF BUSINESS ENVIRONMENT CHARACTERISTICS: A PATH ANALYTIC MODEL OF MANUFACTURING SECTOR IN DEVELOPING COUNTRY

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Abstract: In this research work authors aim to analyze the interface of Business Environment Characteristics (BEC) in Union Territory of Puducherry. Authors have used primary data for this study. Primary data has been collected from the top executives belonging to the functional area of Operations Management of manufacturing enterprises in Union Territory of Puducherry by personally administering a well structured questionnaire. The questionnaire was pilot tested with 52 manufacturing enterprises situated in Puducherry. The final questionnaire was administered to 350 manufacturing enterprises selected at a random. The questionnaire was tested for reliability using Cronbach alpha, Individual item reliability, Construct reliability, Convergent validity and Discriminat validity. The data collected has been suitably represented using tables and figures. The data has been analysed using SPSS and LISREL 8.72 software packages, employing simple as well as modern and sophisticated statistical tools .Confirmatory Factor Analysis has been used to analyze and interpret the data. It can be found that Competitive hostility and Business Cost are at unsatisfactory levels for the manufacturing enterprises while Government laws and regulations and Political environment are at satisfactory levels among the manufacturing enterprises in Union Territory of Puducherry.Dynamism and labour availability are at intermediate level among the manufacturing enterprises in Union Territory of Puducherry.

Key words: Business Environment Characteristics, Manufacturing Enterprises, Confirmatory Factor Analysis and Union Territory of Puducherry.

INTRODUCTION

The three sectors constituting an economy are the Agricultural or Primary sector, the Industry or Secondary sector and the Services or Tertiary sector. The primary sector is directly concerned with natural resources of the country. Agricultural, forestry, fishing and mining constitute the primary sector. The primary sector utilizes the natural resources and produces raw materials and basic goods which

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may be used by the industries or by the end-users. Hence, it can be said that the primary sector serves as a basic sector assisting the growth of the secondary and tertiary sectors. The Secondary sector consists of the industrial sector, engaged in construction activities and manufacturing of finished goods and tangible products. The secondary sector performs the vital role of catering to the needs of potential consumers of the nation. The Tertiary sector is intangible in nature, concentrating on the services sector. This sector consists of provision of services such as education, medical, hotel and finance needed by the consumers.

Early civilization started with excessive reliance on the primary sector. However, with extreme spurt in food production, people started to turn to industries. This led to the industrial revolution during the 19th century. Rapid industrialization saw the development of the support system in the form of the services sector. Thus, the economy evolved from the primary sector to the tertiary sector gradually in phases.

The level of development achieved by any nation is indicated by the position of these three sectors. Any nation in which majority of its GDP is contributed by the Agricultural sector is an "Under-developed nation", while a country whose GDP is largely accounted for by the Industrial sector may be termed as a "Developing nation". In case a nation's GDP is largely contributed by the Tertiary sector, the nation may be categorized as a "Developed Nation".

REVIEW OF LITERATURE

Business Environment Characteristics

Any business is affected by numerous factors, some of which may be controllable while others are uncontrollable. Invariably, the uncontrollable factors remain out of control of the business managers in the short run whereas in the long run, these factors can be countered by framing and executing suitable strategies in accordance to the changing business environment scenario. However, the strategies may differ according to the nature and characteristics of the business firms. The most important factor determining the efficiency of any manufacturing firm is the cost of its operations. The cost sustained by the manufacturing firms in the form of cost of labour, transportation, health care, utilities, raw materials, rent and telecommunications constitute the firm's business cost of operation.

The next important factor determining the success of any firm is the availability of adequate and efficient human resources in the form of skilled labour. Shortage of local and skilled labour force, managerial and administrative staff, technicians and suitable workers in the clerical and production cadres have a bad impact on the efficiency of any manufacturing firm. It becomes urgently important to overcome these hindrances in case the firm wants to project itself as a successful one.

The other important factor affecting the performance efficiency of any manufacturing firms is the Competitive hostility factor. Cut throat competition leading to reduction of profit margins, declining demand in the local and international markets, compulsion to adher to necessary quality standards of production though the quality of raw material supplies may not be reliable put a sword on the neck of manufacturing firms.

To add fuel to the above mentioned factors, government rules and regulations act as a major impediment for the efficient performance of any firm. Complexities of government rules, regulations and procedures, red tapism and delays involved in government finalizing business transactions and government's unwarranted protectionism policies adversely affect the operational efficiency of business firms. Dornier *et al.* (1998) indicates that government regulations always have a significant influence on the operational activities of a manufacturing firm.

Political environment exert a significant influence on the efficiency of any firm. Country's balance of payment situation, Bilateral and multi-lateral agreements entered by the government with other governments, stability of political system in the nation, laws and regulations regarding investment protection and type of military alliances with other countries all may have a significant impact on the operational efficiency of any manufacturing firm. Finally, the highly dynamic conditions prevalent in the market also play a significant role in shaping the efficiency of any manufacturing firm. This domain consists of the rate at which innovation creeps into operations processes, change in customer needs, new challenges from competitors and information diffusion. According to Dess and Beard (1984), Environmental dynamism means unimaginable activities accrued in business environment which is very difficult to face by the manufacturing firms.

Business environment of manufacturing enterprises consist of vitality, intricacy, assortment and largesse (Ward *et al.*, 1995; Mintzberg, 1979; Harris, 2004; Dess and Beard, 1984). The aforesaid issues are most important aspects of business environment with regard to strategic decision-making (Lawless and Finch, 1989). Vitality (dynamism) is the speed at which change occurs in the environment in which firms operate due to technological advancements, competition and change in customer needs and wants. Intricacy (complexity) refers to the acquaintance to be possessed by the firms about their products and customers. Assortment (Diversity) is the nature of homogeneity or heterogeneity of the environment in which the business firms are supposed to operate. Largesse (munificence) refers to the threats and opportunities provided to the business firms by the environment in which they operate. Impact of business environment on business performance has been extensively studied in the past by eminent researchers such as (Van Dierdonck and Miller, 1980; Skinner, 1969; Hofer, 1975).

Judge and Douglas (1998) has found out that enterprises which are able to effectively manage their external and internal environment through efficient strategies can alone manage to achieve good financial and non-financial performance. Krajewski and Ritzman (1996) included conditions of economy, scientific advancements, political environment, resource availability, supplier and buyer strengths and weaknesses and social dimensions into the environmental concerning issues. Heizer and Render (1993) has stated that environment shall consist of fiscal and monetary conditions, artistic (cultural), scientific (technological), personalized and political conditions.

Badri *et al.* (2000) has increased the scope of environment to engulf six issues which are beyond the control of the business administration at least in the short-run. These issues are dynamism, political considerations, cost associated, availability of labour, Government laws and regulations and Competitive hostility in the business environment. Dornier *et al.* (1998) found out that government rules and policies significantly influence the operational efficiency of business enterprises. They are of the opinion that the global environment is often troublesome due to ever-changing political circumstances. Taylor and Gutfeld (1992) express the necessity of enterprises to adjust their operations to accommodate to the changing governmental regulations caused due to change in governments.

The importance of business strategies to enhance the competitive spirit and business performance of business firms have been a point of extensive and serious discussion (Lankoski, 2000; Porter and van der Linde, 1995; Bragdon and Merlin, 1972; Palmer *et al.* 1995).

STATEMENT OF THE PROBLEM

Many business units are started with full vigour in Union Territory of Puducherry. However, these units are not able to survive in the market for longer period of time and they stop their business very early. This research work endeavors to study the factors which are responsible for forcing the manufacturing units to shut down very early and the problems encountered by such units which are forcing them to wind up soon. This study also tries to find the factors which are helping the enterprises to perform successfully in this region from operational perspective.

OBJECTIVES OF THE STUDY

Objective of the present research work is given below:

To study the effects of Business Environment Characteristics of Manufacturing Industries in Union Territory of Puducherry using a Path Analytic Model.

RESEARCH METHODOLOGY

The present research study is descriptive in nature, covering manufacturing industries situated in Union Territory of Puducherry. Primary data have been used for this research. Primary data was collected using a well structured questionnaire, which was administered personally to the executives of manufacturing undertakings in Union Territory of Puducherry.

Prior to the full-fledged resumption of the research process, a pilot study was conducted on some 52 manufacturing undertakings located in Puducherry. Based on the feedback obtained from the Pilot study, the researcher made minor modifications in the questions pertaining to the industrial profile of the manufacturing units studied. These questions were redesigned in statement forms to accommodate the respondent's recommendations. Further, based on their feedback, some technical terms which were not easily understandable for the respondents were suitably modified and substituted with simpler terms. Based on the inputs obtained from the Pilot study, the final schedule was drafted. The final questionnaire was administered to 350 manufacturing enterprises selected at a random. The Business Environment Characteristics construct is divided into six domains namely, Labour Availability, Business cost, Competitive Hostilities, Dynamism, Political Environment and Government Laws and Regulations.

The data has been analysed using SPSS and LISREL 8.72 software packages, employing simple as well as modern and sophisticated statistical tools. Confirmatory Factor Analysis has been used to analyze and interpret the data. Internal consistency of the data can be verified using Reliability test. Cronbach alpha has been applied to verify the internal consistency and reliability of the data. Cronbach coefficient alpha is commonly used to measure the reliability of a set of two or more construct indicators (Cronbach, 1951). It is calculated on the internal consistency based on average correlation among items. The value of Cronbach alpha should exceed the threshold limit of 0.60 to consider the data as reliable (Nunnally, 1978).

The above table displays that the value of Cronbach's á coefficient of all the factors included under the BEC domains range from 0.834 to 0.903. This establishes the reliability of all the factors included under the BEC domain. Furthermore, the estimated value of Cronbachs Alpha in respect of all the variables exceeds the "Alpha if Item Deleted" value and hence, no item needs to be dropped from the study.

ANALYSIS AND INTERPRETATION

This section describes about the Individual variable reliability, Construct reliability, Convergent validity, Discriminat validity, Independent measurement model, First order Confirmatory Factor Analysis and Second order Confirmatory Factor

Table 1
Cronbach's α reliability test for Business Environment Characteristics domains

SL. No	Variables	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
	Business cost		
1	Mounting labor cost	.846	.848
2	Mounting material cost	.818	
3	Mounting transportation cost	.813	
4	Mounting utility cost	.812	
5	Mounting rent	.793	
	Labour availability		
6	Scarcity of managerial Personnel	.883	.903
7	Dearth of technicians	.884	
8	Deficiency of clerical Personnel	.876	
9	Scarcity of skilled and Specialized Personnel	.879	
10	Shortage of Direct Labour	.884	
	Competitive hostility		
11	Stumpy profit margins	.870	.896
12	Dilapidating Local demand	.865	
13	Dilapidating International demand	.861	
14	Dilapidating Product Standards	.888	
15	Dilapidating Quality of Acquired Inputs	.877	
	Government laws and regulations		
16	Complex governmental regulations and procedures	.833	.863
17	Ambiguous government laws and regulations	.814	
18	Red Tapism and Delays	.804	
19	Government's protectionism Policy Towards Industries	.848	
	Political environment		
20	Country balance of payment status	.874	.889
21	Bilateral and Multi-lateral Governmental Agreements	.857	
22	Nation's Political Stability	.861	
23	Regulatory Mechanism for Protecting Investments	.865	
24	Military Coalitions with fellow countries	.867	
	Dynamism		
25	Tempo of innovative operations processes	.827	.834
26	Changing customer Aspirations in the industry	.763	
27	Emerging challenges from competitors	.754	
28	Rate of information diffusion	.778	

Analysis. Business Environment Characteristics of manufacturing enterprises are studied using the factors of Business cost, Labour availability, Competitive hostility, Government laws and regulations, Political environment and Dynamism. Each of these factors and their nature has been discussed in the forthcoming sections in the light of their relevance with Business Environment Characteristics. These external environmental factors are uncontrollable factors as they are beyond the control of the management, particularly in the short run. These factors offer big threat as well as good opportunity for the management. It is indispensable for the management to carefully evaluate these factors and device strategies to counter the challenges posed by them and convert such challenges into opportunities for the business. Hence, studying the Business Environmental Characteristics of manufacturing firms and the likely impact of such factors on the efficiency of the manufacturing firms assumes immense significance to enable these undertakings to take right decisions at the right time. The forthcoming sections shall focus on studying the influence of the Business Environmental Characteristics on the performance of the manufacturing enterprises located in Union Territory of Puducherry.

Independent Measurement Model

Six independent measurement factors have been used to measure the opinion of the respondents about the business environment characteristics of the manufacturing firms. These factors have been discussed in the forthcoming sections.
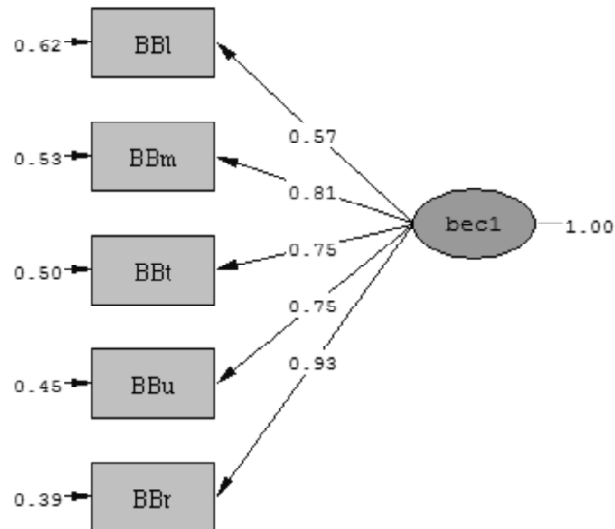
Business cost (bec1)

The independent factor of business cost in business environment characteristics domain was evaluated using five items of BBl, BBm, BBt,BBu and BBr.CFA verifies the proposed factor structure. Table 2 portrays the results of the proposed model. The results may be summed up as follows: X^2 =3.79; df =5; p = 0.00196; Since the P value is less than the desired minimum of 0.05, it can be said that the model fails to fit in the real wisdom. However, a strong X^2 value with large sample size provides scope for employing other tests propagated by writers such as (Hair *et al.* 1998) and the value of such goodness-of-fit measures in respect of such tests are displayed as under: RMSEA = 0.089; RMSEA not more than 0.05 denotes good fit; RMSEA ranging from 0.05 to 0.08 denotes a fair fit; RMSEA ranging from 0.08 to 0.10 denotes mediocre fit (Brown and Cudeck, 1993; Hair *et al.* 1998). Hence, the mediocre fitness of the model is established. GFI = 0.98; AGFI = 0.94; CFI = 0.99; NFI = 0.98; (the values in respect of these indices should exceed the threshold limit of 0.90, which is accomplished). This signifies the mediocre fitness of the model. Hence, the results confirm the acceptability of the derived model.

Table 2
Independent Measurement Model of bec1

Table							Results of Reliability Test	
	Results of Independent Measurement Model (Confirmatory Factor Analysis)							
Item	*Items*	*Standard Solutions*	*Factor estimate*	*t - value*	*Error variance*	R^2	*CR*	*AVE*
Mounting labor cost	BBl	0.59	0.57	11.29	0.65	0.35		
Mounting material cost	BBm	0.74	0.81	15.26	0.45	0.55		
Mounting transportation cost	BBt	0.73	0.75	14.78	0.47	0.53	0.849	0.533
Mounting utility cost	BBu	0.74	0.75	15.30	0.45	0.55		
Mounting rent	BBr	0.83	0.93	17.82	0.31	0.69		

The reliability of the estimates of extracted variance were computed, with indicator standardized loadings and measurement errors (Hair *et al.* 1998; Shim *et al.* 2001). CFA takes care of confirming the designed factor arrangement. Results indicate that the factor arrangement is highly significant. Hence, it can be concluded that all the items included under this domain aptly fit into the said domain. Similarly, the reliability and validity of the model is confirmed by CR being in excess of 0.70 and AVA being in excess of 0.50 respectively. Good reliability and validity of the model signifies the prevalence of satisfactory unidimensionality level.

Chi-Square=18.96, df=5, P-value=0.00196, RMSEA=0.089

Figure 1: Independent Measurement Model of bec1

Figure 1 portrays the model for Business cost (bec1). It can be inferred from the above figure that the factor loading in respect of all the items is well above the requisite quantum of 0.50. Hence, it can be said that all these items are significantly important for the model. Based on the factors loadings of the items, the contribution made by the items in respect of Business cost may be ranked as Mounting rent, Mounting material cost, Mounting transportation cost, Mounting utility cost and Mounting labor cost.
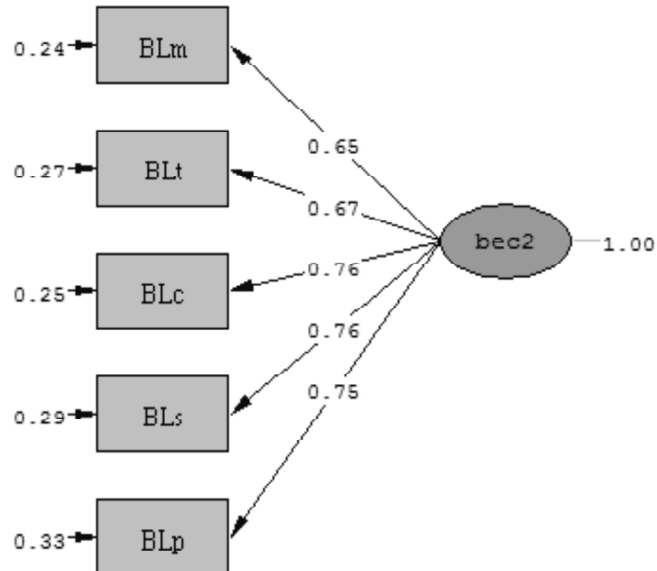
Labour availability (bec 2)

Five indicators namely, BLm, BLt, BLc, BLs and BLp were used to measure the labour availability domain in business environment characteristics. Table 3 shows the Results of Independent Measurement Model of labour availability domain. CFA takes care of confirming the designed factor arrangement. Results indicate that the factor arrangement is highly significant. Hence, it can be concluded that all the items included under this domain aptly fit into the said domain. Similarly, the reliability and validity of the model is confirmed by CR being in excess of 0.70 and AVA being in excess of 0.50 respectively. Good reliability and validity of the model signifies the prevalence of satisfactory unidimensionality level.

Table 3
Independent Measurement Model bec 2

Table	Results of Independent Measurement Model (Confirmatory Factor Analysis)						Results of Reliability Test	
Item	Items	Standard Solutions	Factor estimate	t - value	Error variance	R^2	CR	AVE
Scarcity of managerial Personnel	BLm	0.80	0.65	17.41	0.36	0.64		
Dearth of technicians	BLt	0.79	0.67	17.25	0.37	0.63		
Deficiency of clerical Personnel	BLc	0.83	0.76	18.55	0.31	0.69	0.903	0.651
Scarcity of skilled and Specialized Personnel	BLs	0.82	0.76	17.95	0.33	0.67		
Shortage of Direct Labour	BLp	0.79	0.75	17.27	0.37	0.63		

The calculated values of GFI and RMSEA are 0.99 and 0.068. This satisfies the desired range of above 0.90 for GFI and 0.08 to 0.10 in respect of the RMSEA. Further, the values of AGFI as 0.96, CFI as 0.99 and NFI 0.99 far exceed the desired threshold limit of 0.90. This signifies the mediocre fitness of the model. Hence, the results confirm the acceptability of the derived model.

Chi-Square=13.09, df=5, P-value=0.02257, RMSEA=0.068

Figure 2: Independent Measurement Model of bec2

The model for Labour availability (bec2) is shown in Figure 2. The factor loadings were all above the authors recommended value of 0.50 and significantly important. Based on the factors loadings of the items, the contribution made by the items in respect of Labour availability may be ranked as Deficiency of clerical Personnel, Scarcity of skilled and Specialized Personnel, Shortage of Direct Labour, Dearth of technicians and Scarcity of managerial Personnel.
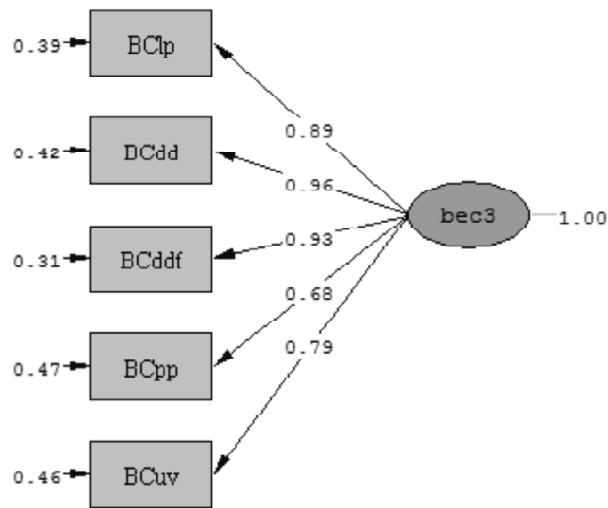
Competitive hostility (bec3)

Five indicators of BClp, BCdd, BCddf, BCpp and BCuv were utilized to measure the competitive hostility factors in business environment characteristics. Table 4 shows the Results of Independent Measurement Model of competitive hostility factors. CFA takes care of confirming the designed factor arrangement. Results indicate that the factor arrangement is highly significant. Hence, it can be concluded that all the items included under this domain aptly fit into the said domain. Similarly, the reliability and validity of the model is confirmed by CR being in excess of 0.70 and AVA being in excess of 0.50 respectively. Good reliability and validity of the model signifies the prevalence of satisfactory unidimensionality level.

Table 4
Independent Measurement Model of bec3

Table	Results of Independent Measurement Model (Confirmatory Factor Analysis)					Results of Reliability Test	
Item	*Items*	*Standard Solutions*	*Factor estimate*	*t - value*	*Error variance*	*R²*	*CR*	*AVE*
Stumpy profit margins	BClp	0.82	0.89	18.04	0.33	0.67		
Dilapidating Local demand	BCdd	0.83	0.96	18.37	0.31	0.69		
Dilapidating International demand	BCddf	0.86	0.93	19.39	0.26	0.74	0.896	0.636
Dilapidating Product Standards	BCpp	0.71	0.68	14.60	0.5	0.50		
Dilapidating Quality of Acquired Inputs	BCuv	0.76	0.79	16.21	0.42	0.58		

The calculated values of GFI and RMSEA are 0.98 and 0.099 respectively. This satisfies the desired range of above 0.90 for GFI and 0.08 to 0.10 in respect of the RMSEA. Further, the values of AGFI as 0.93, CFI as 0.99 and NFI as 0.98 far exceed the desired threshold limit of 0.90. This signifies the mediocre fitness of the model. Hence, the results confirm the acceptability of the derived model.

Chi-Square=22.23, df=5, P-value=0.00047, RMSEA=0.099

Figure 3: Independent Measurement Model of bec3

The model for Competitive hostility (bec3) is shown in Figure 3. The factor loadings were all above the authors recommended value of 0.50 and significantly

important. Based on the factors loadings of the items, the contribution made by the items in respect of Competitive hostility may be ranked as Dilapidating Local demand, Dilapidating International demand, Stumpy profit margins, Dilapidating Quality of Acquired Inputs and Dilapidating Product Standards.

Government laws and regulations (bec4)

The response of the executives of manufacturing units about Government laws and regulations were measured using the four indicators of BGcg, BGug, BGgd andBGgt as constituents of the Independent Measurement Model. Table 5 shows the Results of Independent Measurement Model in respect of Government laws and regulations factor. CFA takes care of confirming the designed factor arrangement. Results indicate that the factor arrangement is highly significant. Hence, it can be concluded that all the items included under this domain aptly fit into the said domain. Similarly, the reliability and validity of the model is confirmed by CR being in excess of 0.70 and AVA being in excess of 0.50 respectively. Good reliability and validity of the model signifies the prevalence of satisfactory unidimensionality level.

Table 5
Independent Measurement Model of bec4

Table	Results of Independent Measurement Model (Confirmatory Factor Analysis)					Results of Reliability Test	
Item	Items	Standard Solutions	Factor estimate	t - value	Error variance	R^2	CR	AVE
Complex governmental regulations and procedures	BGcg	0.76	0.84	15.79	0.43	0.57		
Ambiguous government laws and regulations	BGug	0.82	0.88	17.54	0.33	0.67	0.864	0.615
Red Tapism and Delays	BGgd	0.85	0.96	18.38	0.29	0.71		
Government's protectionism Policy Towards Industries	BGgt	0.71	0.78	14.44	0.50	0.50		

The calculated value of GFI is 1.00 while the desired requisite is above 0.90 and hence, it can be said that the value is highly satisfactory. Further, the values of Chi-Square are 1.36 and P-value is 0.50654, which well exceed the significant value of 0.05. Hence, the results confirm the acceptability of the derived model. Other indicators like AGFI as 1.00, CFI as 1.00 and NFI 1.00 are not necessary to assess in this domain.

The model for Government laws and regulations (bec4) is shown in Figure 4. It can be observed that the factor loadings well exceed the recommended threshold
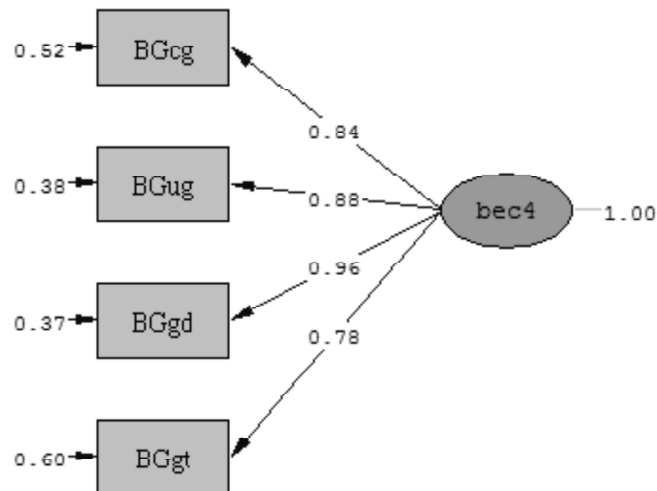
Chi-Square=1.36, df=2, P-value=0.50654, RMSEA=0.000

Figure 4: Independent Measurement Model bec4

value of 0.50 and hence are significantly important. Based on the factors loadings of the items, the contribution made by the items in respect of Government laws and regulations may be ranked as Red Tapism and Delays, Ambiguous government laws and regulations, Complex governmental regulations and procedures and Government's protectionism Policy towards Industries.
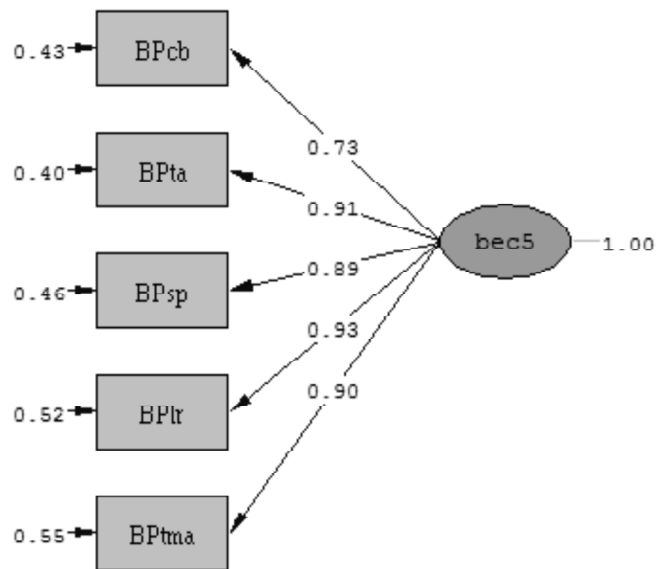
Political environment (bec5)

Five indicators of BPcb, BPta, BPsp, BPlr and BPtma have been used to measure the political environment domain in business environment characteristics of the manufacturing firms. Table 6shows the Results of Independent Measurement Model of political environment domain. CFA takes care of confirming the designed factor arrangement. Results indicate that the factor arrangement is highly significant. Hence, it can be concluded that all the items included under this domain aptly fit into the said domain. Similarly, the reliability and validity of the model is confirmed by CR being in excess of 0.70 and AVA being in excess of 0.50. Good reliability and validity of the model signifies the prevalence of satisfactory unidimensionality level.

The calculated value of GFI is 0.98, which well exceeds the minimum threshold requisite of 0.9, and the value of RMSEA is 0.093, which satisfies the desired range of 0.08 to 0.10. Further, the values of AGFI as 0.93, CFI as 0.99 and NFI as 0.98 far exceed the desired threshold limit of 0.90. This signifies the mediocre fitness of the model. Hence, the results confirm the acceptability of the derived model.

Table 6
Independent Measurement Model of bec5

Table	Results of Independent Measurement Model (Confirmatory Factor Analysis)						Results of Reliability Test	
Item	*Items*	*Standard Solutions*	*Factor estimate*	*t - value*	*Error variance*	*R²*	*CR*	*AVR*
Country balance of payment status	BPcb	0.74	0.73	15.57	0.45	0.55		
Bilateral and Multi-lateral Governmental Agreements	BPta	0.82	0.91	18.02	0.32	0.68	0.88	0.618
Nation's Political Stability	BPsp	0.80	0.89	17.24	0.36	0.64		
Regulatory Mechanism for Protecting Investments	BPlr	0.79	0.93	17.07	0.37	0.63		
Military Coalitions with fellow countries	BPtma	0.77	0.90	16.50	0.40	0.60		

Chi-Square=20.20, df=5, P-value=0.00115, RMSEA=0.093

Figure 5: Independent Measurement Model of bec5

The model for Political environment (bec5) is shown in Figure 5. The factor loadings in respect of all the items far exceed the minimum requisite of 0.50 and hence are significantly important. Based on the factors loadings of the items, the contribution made by the items in respect of Political environment may be ranked

as Regulatory Mechanism for Protecting Investments, Bilateral and Multi-lateral Governmental Agreements, Military Coalitions with fellow countries, Nation's Political Stability and Country balance of payment status.

Dynamism (bec6)

Four indicators of BDri, BDrc, BDre and BDrid were utilized to measure the Dynamism domain in business environment characteristics of the manufacturing firms. Table 7 shows the Results of Independent Measurement Model of dynamism domain. CFA takes care of confirming the designed factor arrangement. Results indicate that the factor arrangement is highly significant. Hence, it can be concluded that all the items included under this domain aptly fit into the said domain. Similarly, the reliability and validity of the model is confirmed by CR being in excess of 0.70 and AVA being in excess of 0.50. Good reliability and validity of the model signifies the prevalence of satisfactory unidimensionality level.

Table 7
Independent Measurement Model of bec6

Table	Results of Independent Measurement Model (Confirmatory Factor Analysis)						Results of Reliability Test	
Item	Items	Standard Solutions	Factor estimate	t – value	Error variance	R^2	CR	AVE
Tempo of innovative operations processes	BDri	0.55	0.56	10.42	0.70	0.30		
Changing customer Aspirations in the industry	BDrc	0.83	0.85	17.75	0.31	0.69		
Emerging challenges from competitors	BDre	0.83	0.84	17.83	0.31	0.69	0.841	0.575
Rate of information diffusion	BDrid	0.79	0.84	16.58	0.38	0.62		

The calculated value of GFI is 0.99, which absolutely satisfies the minimum requisite of 0.9, while the value of RMSEA is 0.056, which satisfies the desired range between 0.05 and 0.08 a fair fit. Further, the P-value is 0.12144, which well exceed the significant value of 0.05. Hence, the results confirm the acceptability of the derived model. Other indicators like AGFI as 0.97, CFI as 1.00 and NFI as 0.99 are not necessary to assess in this domain.

The model for Dynamism (bec6) is shown in Figure 6. The factor loadings in respect of all the items far exceed the recommended threshold value of 0.50 and hence are significantly important. Based on the factors loadings of the items, the contribution made by the items in respect of Dynamism may be ranked as changing customer aspirations in the industry, Emerging challenges from
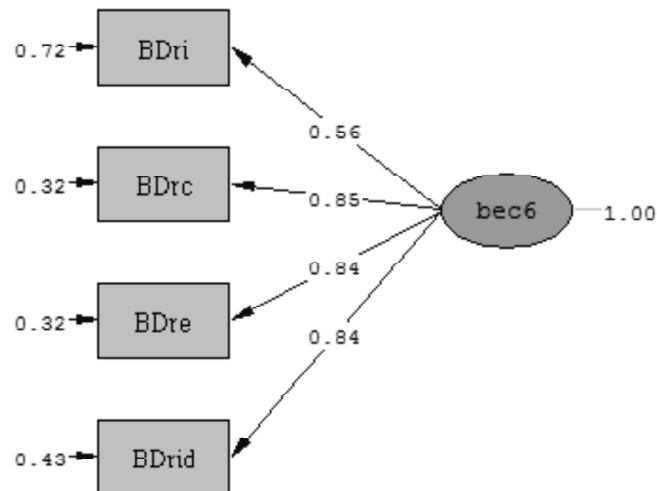
Chi-Square=4.22, df=2, P-value=0.12144, RMSEA=0.056

Figure 6: Independent Measurement Model of bec6

competitors, Rate of information diffusion and Tempo of innovative operations processes.

First Order Measurement Model of Business Environment Characteristics (bec)

Business environment characteristics of the manufacturing firms have been studied using the six factors of Business cost, Labour availability, Competitive hostility, Government laws and regulations, Political environment and Dynamism. These six factors are validated and accepted in Independent Measurement Model by performing First Order Measurement Model Confirmatory Factor Analysis. It helps to study the model very closely. The first order measurement model displays the values of X^2 as592.86, P as 0.00, X^2/df as 1.76, GFI as 0.89, AGFI as 0.87, CFI as 0.98 and RMSEA as 0.047. These results reveal that all the pre-requisites for the acceptance of the First Order Measurement model are well met.

After establishing the individual item reliability of the model, the validity of the model is next tested. The results are presented in Table 8.

The individual reliability of the items was evaluated using factor loadings (Ce´sar Camiso´n and Ana Villar Lo´pez 2010). Carmines and Zeller (1979) has propagated that the factor loadings should not be less than 0.707 to constitute a valid model. However, some researchers such as (Barclay *et al.*, 1995 and Chin, 1998) are of the opinion that factor loadings to the extent of 0.5 or 0.6 are acceptable. In the above table all the factor loadings are above the recommended value it shows the factors having individual reliability.

Table 8
First Order Measurement Model of bec

Table		Results of First Order Measurement Model (Confirmatory Factor Analysis)					Results of Reliability Test	
Items	*Items*	*Standard Solutions*	*Factor estimate*	*t - value*	*Error variance*	*R²*	*C R*	*AVE*
		Business cost						
Mounting labor cost	BBl	0.59	0.58	11.57	0.65	0.35	0.849	0.533
Mounting material cost	BBm	0.74	0.81	15.51	0.45	0.55		
Mounting transportation cost	BBt	0.74	0.76	15.45	0.45	0.55		
Mounting utility cost	BBu	0.75	0.75	15.60	0.44	0.56		
Mounting rent	BBr	0.81	0.91	17.54	0.34	0.66		
		Labour availability						
Scarcity of managerial Personnel	BLm	0.8	0.65	17.45	0.36	0.64	0.904	0.653
Dearth of technicians	BLt	0.79	0.67	17.28	0.37	0.63		
Deficiency of clerical Personnel	BLc	0.83	0.75	18.45	0.31	0.69		
Scarcity of skilled and Specialized Personnel	BLs	0.82	0.76	18.11	0.33	0.67		
Shortage of Direct Labour	BLp	0.8	0.76	17.55	0.36	0.64		
		Competitive hostility						
Stumpy profit margins	BClp	0.82	0.89	18.09	0.33	0.67	0.895	0.632
Dilapidating Local demand	BCdd	0.83	0.97	18.56	0.31	0.69		
Dilapidating International demand	BCddf	0.85	0.93	19.31	0.27	0.73		
Dilapidating Product Standards	BCpp	0.71	0.68	14.68	0.5	0.50		
Dilapidating Quality of Acquired Inputs	BCuv	0.76	0.79	16.12	0.43	0.57		
		Government laws and regulations						
Complex governmental regulations and procedures	BGcg	0.76	0.84	15.93	0.43	0.57	0.865	0.617
Ambiguous government laws and regulations	BGug	0.81	87	17.56	0.34	0.66		
Red Tapism and Delays	BGgd	0.85	0.96	18.78	0.28	0.72		
Government's protectionism Policy Towards Industries	BGgt	0.72	0.79	14.84	0.48	0.52		
		Political environment						
Country balance of payment status	BPcb	0.74	0.73	15.57	0.45	0.55	0.889	0.617
Bilateral and Multi-lateral Governmental Agreements	BPta	0.82	0.91	18.12	0.33	0.67		
Nation's Political Stability	BPsp	0.8	0.90	17.44	0.36	0.64		
Regulatory Mechanism for Protecting Investments	BPlr	0.79	0.94	17.25	0.37	0.63		
Military Coalitions with fellow countries	BPtma	0.77	0.90	16.55	0.4	0.60		

contd. table

Items	Items	Standard Solutions	Factor estimate	t - value	Error variance	R^2	C R	AVE
		Dynamism						
Tempo of innovative operations processes	BDri	0.55	0.56	10.60	0.69	0.31	0.841	0.576
Changing customer Aspirations in the industry	BDrc	0.83	0.84	18.01	0.31	0.69		
Emerging challenges from competitors	BDre	0.82	0.84	17.88	0.32	0.68		
Rate of information diffusion	BDrid	0.8	0.85	17.02	0.37	0.63		

Notes:

$$\text{Construct reliability} \ (CR) = \left(\sum \text{Standardized loadings}\right)^2 \Big/$$
$$\left[\left(\sum \text{Standardized loadings}\right)^2 + \sum ej\right]$$

$$\text{Average variance extracted (AVE)} = \sum \left(\text{Standardized loadings}^2\right) \Big/$$
$$\left[\sum \left(\text{Standardized loadings}^2\right) + \sum ej\right]$$

where
ej is the measurement error

Table 9
Reliability

Construct	Item reliability	Construct reliability	AVE
Suggested value	>0.5	>0.6	>0.5

Source: Fornell and Larcker (1981)

The next step is to ensure the internal consistency of all the items used for measuring the same concept. This can be done through construct reliability which evaluates the rigorousness with which the latent item is measured by the observable item (Fornell and Larcker, 1981). The authors have propagated that the AVA value should not be less than 0.5 to ensure convergent validity of the model. The construct reliability should be above 0.6 and table 5.28 portrays that the construct reliability value in respect of all the items far exceeds the minimum requisite value. Hence, all the measurable items command the desirable construct reliability. Table 9 displays that the AVA value in respect of all the constructs far exceeds the minimum threshold value.

The model for Business Environment Characteristics (bec) is shown in Figure 7. The factor loadings in respect of the items far exceed the recommended value of 0.50 and hence they are significantly important.
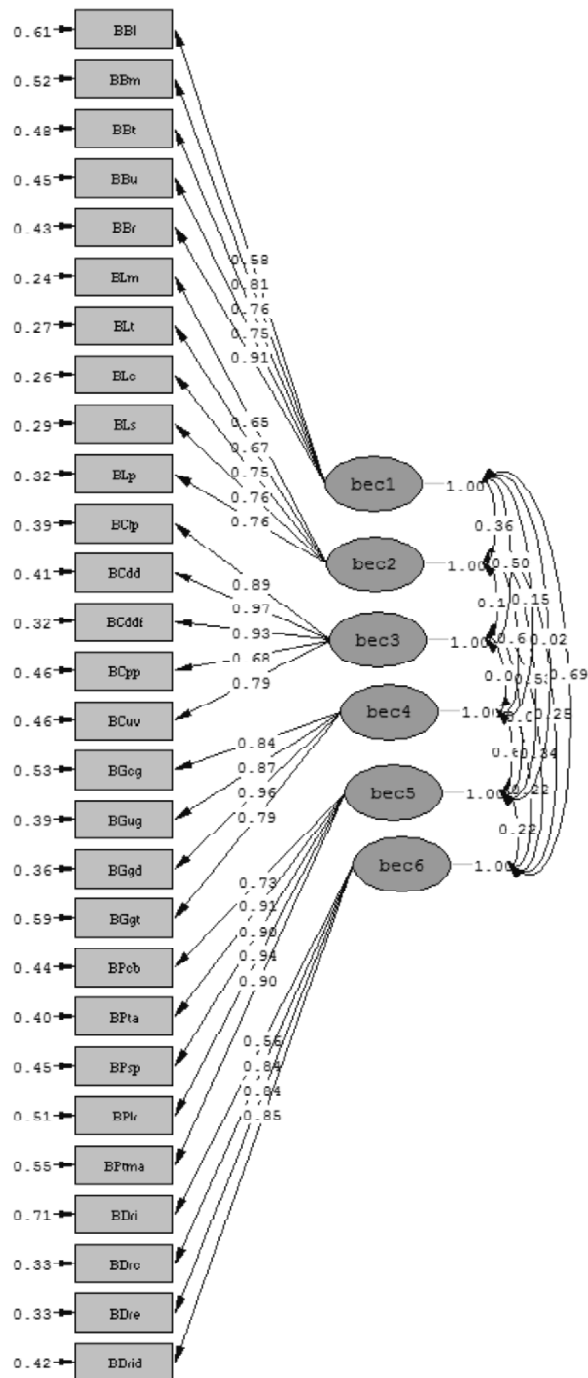
Chi-Square=592.86, df=335, P-value=0.00000, RMSEA=0.047

Figure 7: First Order Measurement Model of bec

Discriminat Validity

The distinctiveness of a construct from the other constructs in a model is confirmed by Discriminat validity. This validity may be verified by comparing the AVA with the square of the correlations of the constructs. Table 10 indicates that the AVA values far exceed the square of the correlation coefficient and hence the discriminant validity of the model is confirmed (Fornell and Larcker, 1981).

Table 10
Correlation Matrix of Independent Domains

	BEC6	BEC5	BEC4	BEC3	BEC2	BEC1
BEC6	(0.575)					
BEC5	0.048	(0.618)				
BEC4	0.048	0.448	(0.615)			
BEC3	0.115	0.0009	0.0016	(0.636)		
BEC2	0.062	0.280	0.396	0.019	(0.651)	
BEC1	0.476	0.0004	0.022	0.25	0.129	(0.533)

Notes: Diagonal elements (values in parentheses) are the Average Variance Extracted (AVE); off-diagonal elements are the square correlations among constructs.

Second Order Measurement Model of Business Environment Characteristics (bec)

First Order Confirmatory Factor Analysis for Business environment characteristics factors were discussed in the previous sections. The Business Environment Characteristics constructs of Business cost, Labour availability, Competitive hostility, Government laws and regulations, Political environment and Dynamism were related to Business Environment Characteristics. It shows that the model is acceptable in First Order Confirmatory Factor Analysis. This was tested with a second order confirmatory factor analysis model where it was assumed that if the constructs were linked to each other. Therefore Second Order Measurement Model of Business Environment Characteristics (bec) is conducted in the forthcoming section.

In the measurement model and First Order model discussed earlier, six factors have been considered as independent items. These factors are one unidirectional arrow away from the observed items and were consequently labeled as "First-Order Factors". Available theory suggests that higher level factor is accountable for lower-level factors. The second-order model represents the BEC, which has not been measured from the respondents. Instead, the BEC derives its value from the six factors included in the first-order model. Hence, the six factors included in the first-order model as independent items now become dependent items. This implies that the variances and co-variances of these factors discontinue being the probable parameters in the model. It should be remembered that these variations and co-variations should be accounted for by the higher-order factor (Bentler, 1992a; Byrne, 1988; Joreskog and Sorbom, 1993).

Table 11
Second Order Measurement Model of bec

Table			*Results of Second Order Measurement Model (Confirmatory Factor Analysis)*			
Items	*Items*	*Standard Solutions*	*Factor estimate*	*t - value*	*Error variance*	R^2
Business cost						
Mounting labor cost	BBl	0.60	0.58		0.64	0.36	0.30
Mounting material cost	BBm	0.74	0.80	10.46	0.45	0.55
Mounting transportation cost	BBt	0.78	0.75	10.35	0.47	0.53
Mounting utility cost	BBu	0.75	0.75	10.52	0.44	0.56
Mounting rent	BBr	0.82	0.93	11.11	0.32	0.68
Labour availability						
Scarcity of managerial Personnel	BLm	0.80	0.65		0.36	0.64	0.76
Dearth of technicians	BLt	0.79	0.67	16.08	0.38	0.62
Deficiency of clerical Personnel	BLc	0.83	0.75	17.07	0.32	0.68
Scarcity of skilled and Specialized Personnel	BLs	0.82	0.76	16.84	0.33	0.67
Shortage of Direct Labour	BLp	0.81	0.76	16.52	0.35	0.65
Competitive hostility						
Stumpy profit margins	BClp	0.82	0.89		0.33	0.67	0.14
Dilapidating Local demand	BCdd	0.83	0.96	17.53	0.31	0.69
Dilapidating International demand	BCddf	0.86	0.93	18.22	0.27	0.73
Dilapidating Product Standards	BCpp	0.71	0.68	14.23	0.50	0.50
Dilapidating Quality of Acquired Inputs	BCuv	0.76	0.80	15.70	0.42	0.58
Government laws and regulations						
Complex governmental regulations and procedures	BGcg	0.76	0.84		0.42	0.58	0.84
Ambiguous government laws and regulations	BGug	0.82	0.87	15.22	0.33	0.67
Red Tapism and Delays	BGgd	0.84	0.96	15.72	0.29	0.71
Government's protectionism Policy Towards Industries	BGgt	0.71	0.78	13.13	0.49	0.51
Political environment						
Country balance of payment status	BPcb	0.75	0.74		0.44	0.56	0.72
Bilateral and Multi-lateral Governmental Agreements	BPta	0.82	0.91	15.28	0.32	0.68
Nation's Political Stability	BPsp	0.80	0.90	14.82	0.36	0.64
Regulatory Mechanism for Protecting Investments	BPlr	0.79	0.93	14.64	0.38	0.62
Military Coalitions with fellow countries	BPtma	0.77	0.90	14.35	0.40	0.60
Dynamism						
Tempo of innovative operations processes	BDri	0.55	0.56		0.70	0.30	0.35
Changing customer Aspirations in the industry	BDrc	0.83	0.85	10.27	0.31	0.69
Emerging challenges from competitors	BDre	0.83	0.84	10.27	0.31	0.69
Rate of information diffusion	BDrid	0.78	0.84	10.01	0.39	0.61

In general, statistics indicate that the fit of the second-order model is as good as that of the first-order model. The results displayed in Table 11 representing the final full second- order BEC CFA measurement model, shows that the loadings of all six first-order factors on the second-order factor are positive and significant. The model yielded a good model fit of X^2=881.69, P=0.00, X^2/df=2.56, GFI=0.85, AGFI=0. 82, CFI=0.96 and RMSEA=0.067.

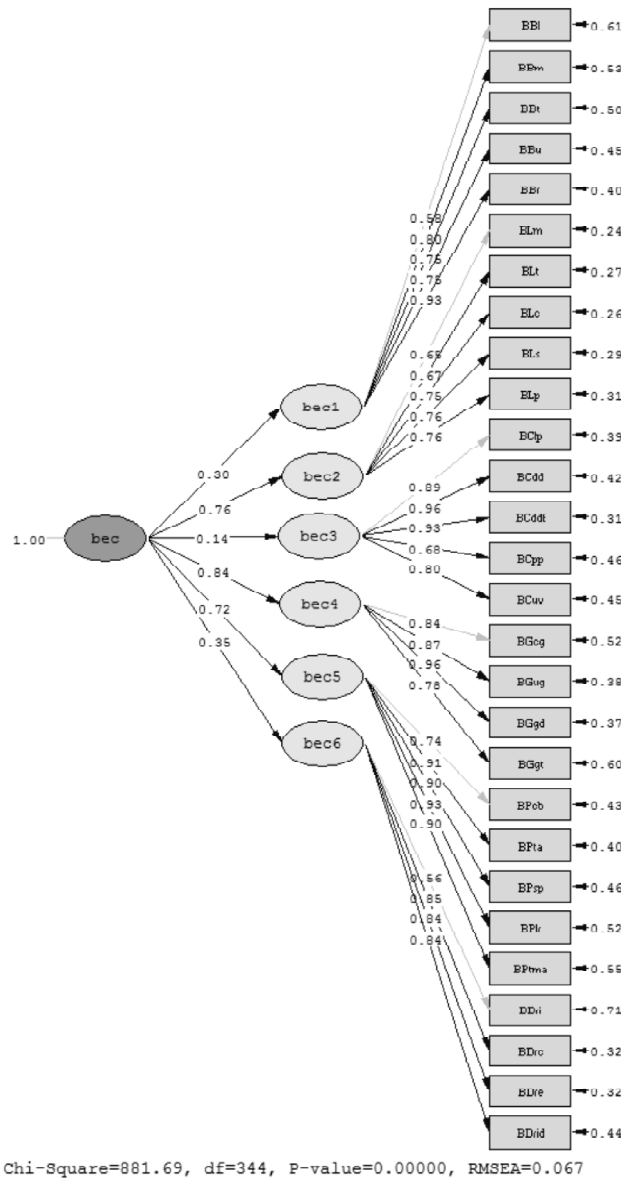Chi-Square=881.69, df=344, P-value=0.00000, RMSEA=0.067

Figure 8: Second Order Measurement Model of bec

The model for Business Environment Characteristics (bec) is shown in Figure 8. The factor loadings in respect of all the items far exceed the recommended value of 0.50 and hence are significantly important. The results confirm that empirical data adequately fit for this second order Business Environment Characteristics model. Based on the factors loadings of the items, the contribution made by the domains in respect of Business Environment Characteristics may be ranked as Government laws and regulations, Labour availability, Political environment, Dynamism, Business cost and Competitive hostility.

CONCLUSIONS

From this research work , the variables under BEC for the manufacturing enterprises which merit immediate attention are as given below: Dilapidating Product Standards occupying the top position followed by Dilapidating International demand, Stumpy profit margins, Dilapidating Quality of Acquired Inputs, Mounting transportation cost, Mounting utility cost, Dilapidating International demand, Mounting rent, Mounting material cost and Mounting labor cost.

Competitive hostility and Business Cost are at unsatisfactory levels for the manufacturing enterprises while Government laws and regulations and Political environment are at satisfactory levels. Dynamism and labour availability are at intermediate level.

Based on the results obtained from this study, the authors propose to make the following recommendations to enhance the operational efficiency of manufacturing enterprises in the Union Territory of Puducherry.

The manufacturing enterprises in Puducherry are confronting many challenges, the most important being Competitive hostility and Business Cost. These two aspects are threatening the very survival of the enterprises. The other related problems confronting the enterprises are Dilapidating product standards, Dilapidating International demand, Stumpy profit margins, Dilapidating Quality of Acquired Inputs, Dilapidating Local demand, Swelling transportation cost, Swelling utility cost, Swelling labor cost and Swelling material cost. The need of the hour is to address cost constraints and declining market demand. It is inevitable for the enterprises to install cost-effective manufacturing technology in their production system. This will enhance the quality of the goods produced and minimize the cost of production. Once cost decreases and quality is enhanced, automatically the demand for the products will increase both in the local and international markets. This will automatically lead to enhancement in profit margin of the enterprise. Hence, the problems of declining demand and decreasing profit margins can be addressed simultaneously with the redressal of cost issues associated with the manufacture process.

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