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Factors Influencing ICT Adoption in SMEs

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Abstract:
Upliftment of economy, new job creation, industrialization of small regions, removing economic disparity and improving social development of undeveloped areas are the result of contribution from the small and medium-sized enterprises (SMEs) Sector. Information and Communications Technology (ICT) has given leverage to SME sector through which they can compete with global industries and cope up with market conditions. Present stage of small industries demand the usage of ICT in their work activities to improve productivity and bring quality into the products. In India different studies about ICT usage in SMEs show that, the factors affecting the ICT implementation in a holistic approach was missing and also the list of factors does not elaborate all the parameters. The focus of this research work is to find the factors that affect ICT implementation in SMEs, establish relationship between SMEs performance and to suggest a conceptual framework for SMEs to adopt ICT. Data (During December 2019) was collected from 100 SMEs through questionnaire design covering the all the identified factors and analysis was done through Statistical Package for Social Sciences (SPSS) software. The research work revealed that ICT is important for SMEs to enhance their performance. Organizational management (Internal Factor) concentrates on employee skills and Extraneous and Stability conditions (External Factor) focusing on the demographic existence. Internal factors can be controlled by the organizations themselves, whereas the external factors need to be taken care by the Government Agencies and Industrial Associations. The purpose of this research work was to identify both external and internal factors that affect ICT adoption and to analyze the factors and their impact on organizational performance.

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I. INTRODUCTION

Dynamic shift has taken place from agricultural activities to non agricultural activities due to industrialization and a nation's development is owed to industrial development in that region. Micro, Small and Medium Enterprises (MSME) sector has great contribution to Indian economy post independence. MSMEs provide huge employment opportunities, serve as ancillary units to large organizations, uplift rural and backward areas. Definition of Small and Medium Enterprises (SMEs) vary from country to country. As per Henry Ongori [1], based on employee strength the SMEs definition for different countries is as shown in the Table.1

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Table.1: SME definition based on Employee Strength

Country Name	Australia	Indonesia	Kenya	India
Employee Strength	5-199	5-99	11-99	10 to 100

(Source: Various publications of Ministry of MSMEs in India, 2019)

Small Scale Industries (SSI) took care of industrial sector constituting tiny and auxiliary units before the new definitions of SMEs was given in terms of investment and number of employees in India as per Micro, Small and Medium Enterprises Development (MSMED) Act, 2006.There is a healthy and progressive growth in number of Enterprise Memorandum (EM)-II filings from 2007-08.There are 2003673 Micro,228008 Small and 8781 Medium enterprises as per MSME 2018 annual report and out of these 9,93000 are in manufacturing and 12,53000 in service sector. There is a constant growth rate, as per Planning Commission, Government of India (GoI), 2017[2] considering the contribution to Gross Domestic Product (GDP) from the industry sector, which constitute Indian economy, from the year 1950-2014.SMEs has great role in contributing to Gross Domestic Product(GDP) and employment generation in India. Indian SMEs part right now contributes about 8% to the nation's GDP however; It can possibly be a distinct advantage for the nation's economy. Manufacturing SMEs are key drivers of the Indian economy and their potential is yet to be tapped to the fullest extent. India has a wonderful chance to increase their contribution towards GDP by at least 50% from the current 8%. The manufacturing and service industries in India are grouped under the MSME (Micro, Small and Medium Enterprise) class based on their investment in plant and apparatus as appeared in Table. 2

The SMEs are confronting numerous issues to develop and improve the economy by competing with global players. The administration perceives the significance of SMEs for the general improvement of the nation, and right now has set up to bridle the emitting issues related with them. The significant deterrent in the extension of SMEs is the inaccessibility of adequate assets to back their development. Measures proposed by the legislature would guarantee accessibility of sufficient assets to MSMEs to control their development. ICT is an extended term for information technology (IT). ICT in MSME Sector is one of the plans started by Government of India (GoI) to empower MSMEs to scan for value chain. ICT includes communication tools like digital equipments, mail, internet, intranets, video conferencing and fax machines (Todd Dewett.et.al., 2001 [3]). Huge investment for adopting ICT is taken up by SMEs to compete in globalised world by targeting quality products and services. (Morteza Ghobakhloo [4]). Scarcity of skilled human resources and capital resources hinder SMEs as compared to large organizations in implementing ICT. (Domenico Consoli [5]). Businesses today are giving more importance to ICT tools to carry out different tasks to meet customer requirements. (Kadadevaramath [6]).

II. Literature Review

The literature shows that most of studies identified the barriers for ICT adoption in terms of internal and external barriers. Internal barriers concentrate on top management's willingness, skills of employees and external barriers focusing on government policies and uncertainty in the environment.

Table.2: Revised MSME Definitions

Description	Manufacturing Sector	Service Sector
Micro Enterprises	Up to 50 Lakhs	Up to 20 Lakhs
Small Enterprises	Above 50 Lakhs and below 10 Crore	Above 20 Lakhs and below 5 Crore
Medium Enterprises	Above 10 Crore and below 30 Crore	Above 5 Crore and below 15 Crore

(Source: Various publications of DCSME including Small Scale Industries in India and National Statistics Department, 2019)

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The different barriers for adopting ICT by SMEs consolidated from the literature survey are listed in the Table.3 and Table.4

Table.3: Indicators and Author References (Internal and External Factors)

Morteza Ghobakhloo.et.al(2012)[4] Legal issues, Competitiveness of environment, Financial resources availability, Level of IT investment, External expertise and services availability and support, Users IT competence ,Users training, Users attitudes, Users participation and involvement, Organizational structure, Organizational culture
Domencio Consoli, (2012)[5] Political, legal and regulatory barriers, Public policies, Competitive pressure, customer innovative requirements, Infrastructure, Existing technological infrastructure, Adoption and implementation cost, Macroeconomic costs, Firm characteristics, Cultural barriers, Social barriers, high skills, learning by doing processes
Henry Ongori(2011)[1] Lack of support by government, Lack of infrastructure, Lack of human capital, Efficient, administration, control and accountability, Lack of financial resources
Abdel Nasser H. Zaied(2012)[7] Government policy and regulations legal and regulatory systems procedures and guidelines, Competitive pressure, Lack of secure payment infrastructure, Lack of qualified staff
Kadadevaramath.et.al(2014)[6] Financial resources, Services availability and support, Consultant effectiveness and competence
Lucy Chairoel.et.al(2015)[8] Financial resources, Orientation to strategy , coordination and the suitability, employee's knowledge, Knowledge and proficiency

Table 4: Indicators and Author References (Organizational Performance)

Firm profitability	A S. Maiga.et.al(2009) [10]
Productivity, product quality, customer satisfaction	Domencio Consoli, 2012[5]
Customer retention, Sales growth, Profitability	Eldon Y. Li.et.al(2006)[11]
productivity, cost reduction ,product quality ,product delivery	Lucy Chairoel.et.al(2015)[8]
Increasing efficiency, improving customer service	Henry Ongori.et.al(2011)[1]

(Source: Table generated by Author after literature survey)

The different performance parameters to show the effectiveness of ICT adoption from the literature survey is shown in the table above .Extensive literature survey work was carried and lot of information was gathered from different sources like industry reports, journal papers and industry persons. From this, the exploration of secondary data is carried out. ICT has become necessity for the enterprises to sustain the external threat from the outside world. Barriers for ICT adoption were categorized into two main groups: internal factors and external factors. (Morteza Ghobakhloo [4]). SMEs in developing nations have to design mechanisms to eradicate barriers for ICT adoption. IT training for the proprietor/director can be utilized to defeat these obstructions. Inner hindrances can be settled inside the organization by the administration itself, while outside obstructions should be tended to either by government mediation or by SMEs mentors (Faitira Manuereet.et.al, 2012[12]).The literature survey reveals that technical, legal and regulatory barriers are very significant for ICT adoption by SMEs. E-commerce has high impact to channelize the enterprise customer base. SMEs have only adopted the basic ICT tools. Security and protection are basic issues that need to take the most elevated level of need in online business execution process. Making a uniform vital arrangement for web based business ventures is the initial step for effective selection of web based business. Resident's attention to online business and other new e-

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administrations need to be tended addressed (Abdel Nasser H. Zaied [7]).The procedure of selection of ICT is complex and it is accompanied by the following conditions: business conditions (affectability and responsibility of the top vital administration), hierarchical conditions (the nearness of an ICT Pivot: business visionary, supervisor, IT office representative or outer expert/merchant), the board conditions (a fitting presidium of ICT apparatuses by talented human resources).The examination of variables of ICT adoption and the effects on associations are essential to comprehend the way to invigorate the procedure of interest in new advancements to gain upper hands and great business exhibitions in SMEs(Domenico Consoli [5]).

III. Proposed Research Model

The factors which have been identified from the literature survey are further defined as hypothesis statements for further testing. A hypothesis is an assumption, explaining an observation or scientific problem that can be tested by further observation, investigation and/or experimentation. In this study hypothesis was built between independent variables and the dependent variable organizational performance and was tested for adequacy. The hypotheses assume the relationship between the input variables and process factors. Both the input variables and process factors are tested for their relationship with output factors. The proposed conceptual model for the present research work involves four external and four internal barriers for ICT adoption. And 8 hypothesis statements were framed for the study. ie..Government Regulations, Extraneous and Stability, Capital Resources, Financial Management, Organization Management, Consultancy And Vendors, Strategic Planning, Facility Planning were considered as *Independent Factors* and Organizational Performance as *Dependent Factor*.

IV. Analysis Of Data

a) Reliability Analysis

The most widely recognized way of internal consistency is Cronbach's alpha and is utilized with different Likert inquiries in a survey. The explanation behind estimating internal consistency is that the pointers of scale should quantify the same construct and parameters must be profoundly correlated. Cronbach's alpha is unwavering quality coefficient which looks at the whole scale consistency. Limits for Cronbach's alpha are 0.60 to 0.70 for exploratory research. The Cronbach's alpha for various builds are appeared in underneath Table 5.

b) Normality Test

Table 5: Cronbach's Alpha for different factors

Government Regulations	0.846	Consultancy And Vendors	0.664
Extraneous and Stability	0.816	Strategic Planning	0.808
Capital Resources	0.540	Facility Planning	0.776
Financial Management	0.784	Organizational Performance	0.689
Organization Management	0.849	Overall	0.930

For many statistical analysis test for normality of data is a prerequisite as it is basic assumption in parametric testing which can be tested either graphically or numerically. An empirical measure of normality involves skewness and kurtosis. Normality test is taken up to examine whether the modeled dataset follows normal distribution or not. Value of Skewness varies from -2.573 to -0.716 Kurtosis values vary from -0.021 to 6.813 for all the indicators. Therefore all indicators are within the acceptable region of normality test. This is supported by (West et al., 1995) [13] who asserts that Skewness values and Kurtosis values for all the indicators should be less than 2 and 7. Figure.1 gives the normal distribution curve for each factor.

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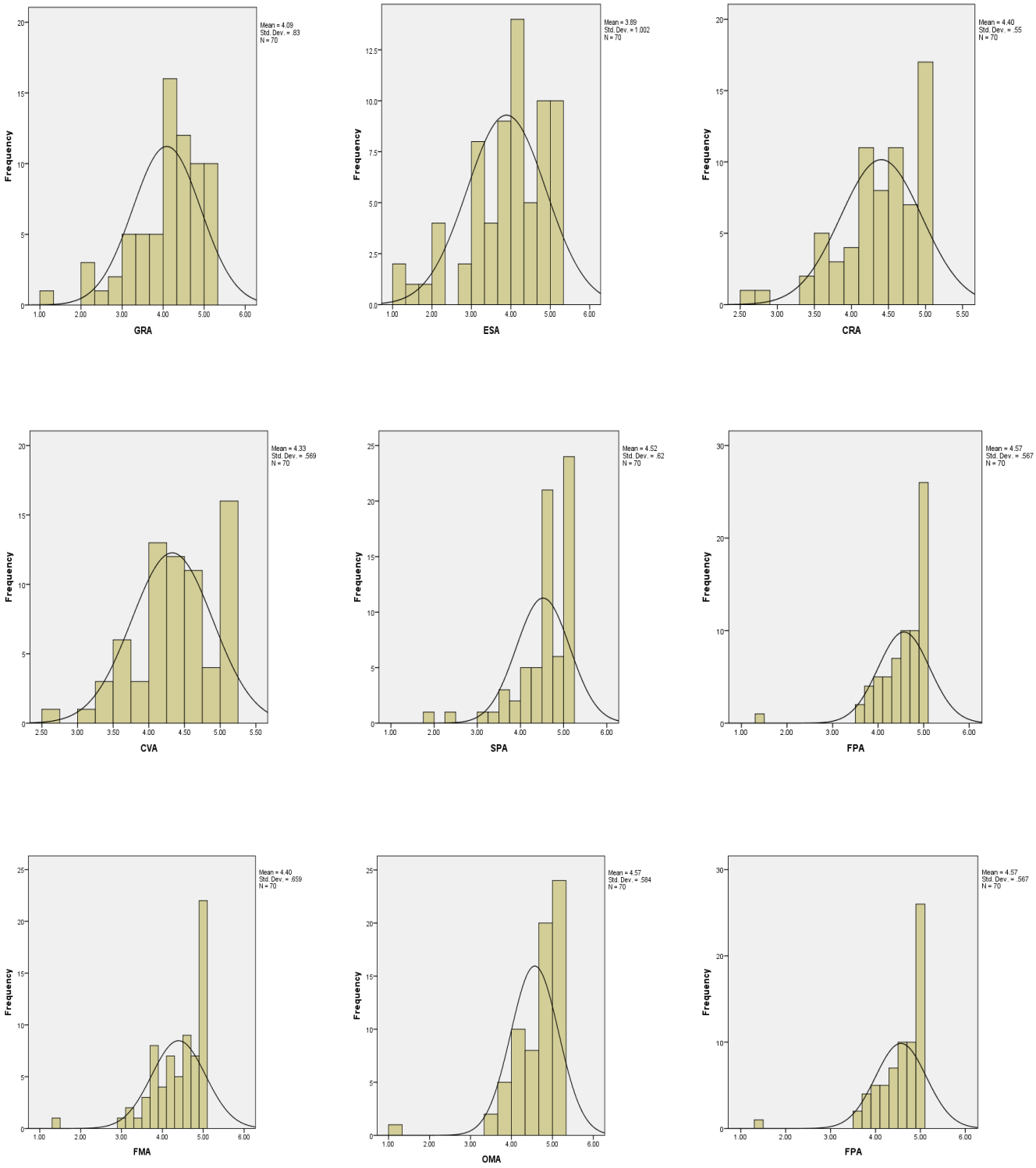

Figure.1: Normal Distribution Curve for all Factors

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c) Bivariate Correlation Analysis

Basic relationship with respect to two indicators is depicted using Correlation coefficients. Two indicators may have either positive or negative correlation. Highest Correlation Coefficient was between Facilities Planning (FP) and Organization Management (OM). (0.804**) i.e. well planned maintenance of machines and supporting facilities, well planned layout to aid flexibility, transparency and standardization motivate employee's participation and involvement. Lowest Correlation Coefficient was between Government Regulations (GR) and Organization Management (OMI) (0.105), but both are significant factors for the ICT adoption process.

d) Regression Analysis

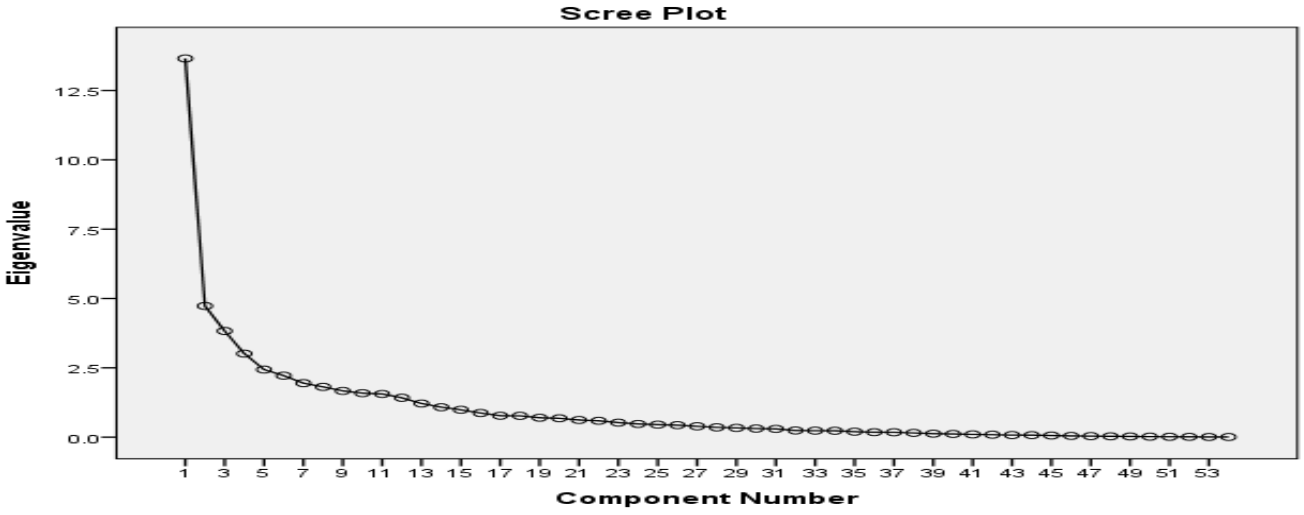
Regression analysis is used to understand association between selected variables. The coefficient of determination (R^2) determined was 0.387.This gives an indication that 38.7% of variation in the dependent variable is justified by all the independent variables. Analysis of variance (ANOVA) states that the F statistic value is statistically crucial and right at a value of 4.812. This points out that all the independent variables are closely related to the dependent variable.

e) Factor Analysis

Multivariate analysis is used for model validation. Exploratory factor analysis is performed to examine the underlying structure of group of indicators. For factor analysis the threshold value of KMO is 0.5 and the value obtained was well near to the limit i.e. 0.530. Bartlett's test of sphericity limiting value is 0.05 and the obtained value was 0.000 which is less than limiting value. Extraction of factors was carried through factor analysis with the principal component analysis method. Total variance of 65.37% explains the information contained in 9 factors. Total variance of 60% is the limiting value which is considered to be satisfactory in social sciences (Hair et al., 2003[14]). Rotation methodology for distribution for different factors was done as many variables were loaded onto more than one factor.

In social sciences it is better if each variable is loaded to one factor by which interpretation of results will give more meaning in decision making. For 30 iterations rotation was converged and through this 9 indicators were deleted. To understand the most significant factor for variability of data Scree plots are plotted. After factor 7, line starts to straighten which states that 7 factors will give more information about variability of data as depicted in

Figure No.2.



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The regenerated model after factor analysis after deletion of 9 indicators with new factor names is depicted below. Figure.3

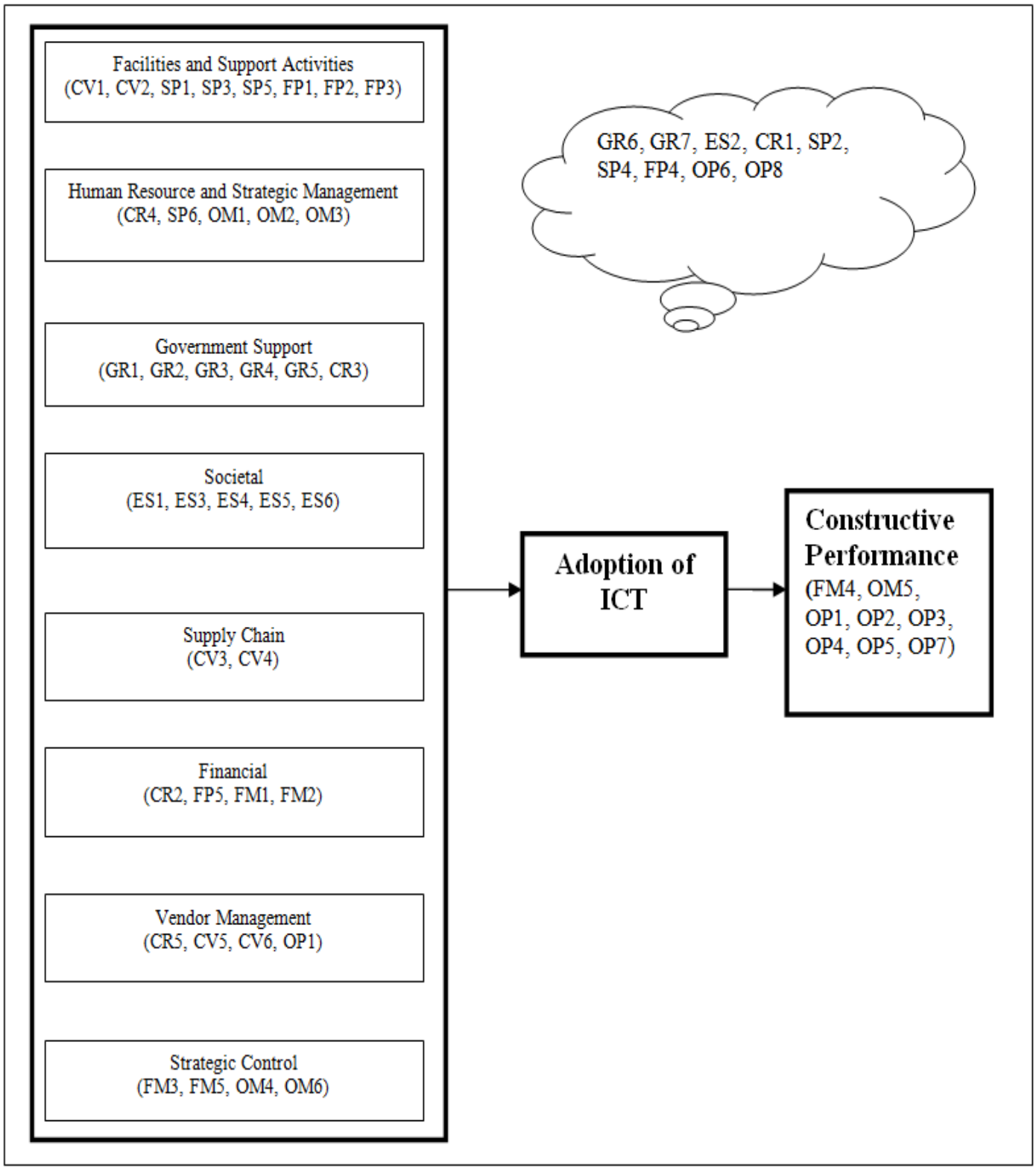

Figure. 3 Regenerated Model

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V. Conclusion

Regression analysis revealed that two hypothesis statements , '*Extraneous and Stability'* and '*Organisational Management'* influences organizational performance of SMEs. Remaining six hypothesis statements were rejected declareing that *Government Regulations, Capital Resources, Consultants and Vendors, Strategic Planning, Facilities Planning and Financial management* are not the critical barriers for ICT adoption by SMEs.(p-values, not significant)

VI. Highlights Of The Research

1. **Independent Internal** controlled factors are the drivers for ICT implementation in manufacturing SMEs in the tier 2 cities.
2. **Quality Dominates Quantity** in present scenario of industrial exploration.
3. **Extraneous and stability** conditions will have 'long term effect' on the adoption and implementation of ICT.
4. **Formal training** to the employees would always enhance the ICT acceptance and usage.
5. **Supportive policies and regulations** (GoI) cause constructive technological up gradation in an organization.
6. **Supportive & Dedicated Infrastructure** with ICT would improve performance

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