



# The Journal of Indian Management & Strategy

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◀ View Point

# A TRUE VISIONARY

*“You see things and you say **Why?** But I dream of things that never were and say **Why not?**”*

- George Bernard Shaw



Shri Jagannath Gupta  
(1950 - 1980)

*Also a true visionary...who dared to dream!  
He lives no more but his dreams live on....and on!*

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*And more dreams to come!*



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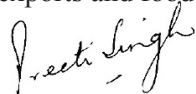
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## Editor's Desk

Business data analytics is the buzz word in corporate business for analyzing data and taking decisions. Over the last few years business is flooded with a volume of data and it is called 'big data'. This is commonly known as 'internet of things'. The data analyst has been taken over by the business data analyst. Data analyst provides raw data and its analysis and the business data analyst takes the decisions. Business data analytics is therefore a concoction of statistical techniques, quantitative analysis, modelling techniques and fact based management to develop strategy and optimize solutions in business. Every organization has different kinds of work assigned to people. A data driven organization has to understand the different situations such as what happened? Why did it happen? What is likely to happen and what should be done about it? This can be explained through a story where you are in an elevator and a dangerous person gets in. Then the person waits for you to press the elevator button and after that he presses the button of the floor right below you. When you get to that floor the door will open and the dangerous person will go out. As the doors are about to close, he will turn around and in the small opening between the two doors he will show you his fist. Then you will hear him say "I will box your ears". In this story, you do not know why the dangerous person wants to beat you but for a while you are scared and do not know what to do. The dangerous person will then go up stairs and wait till you come. When your door opens he will be there to beat you up. This is the scare in business as to what is likely to happen. This is the decision that a business data analytics has to take when he is experiencing lot of problems and how to optimize and succeed by taking the right decision. Should he be beaten by the dangerous man or should he take some other route through which he can succeed. At this point, business data analytics helps and you take small steps to save your skin by changing your route.

Predictive analytics helps in developing some patterns to identify and assess the risks as well as the opportunities in a particular condition. It captures the different factors, associated with the risk in a particular state and helps to predict through predictive analytics as to what is likely to happen and then to take prescriptive action. The business analytics which help in generating meaningful information in anticipating why a particular condition is happening and how to make the most in particular situation goes hand in hand with predictive analytics and is applied through prescriptive analytics. Business organizations should be encouraged to leverage big data analytics in every field to name a few financial institutions and banking sector, healthcare industry, social media, service industries, exports and food chains.

  
(Preeti Singh)

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# ACTIVITY BASED COSTING AND PROFITABILITY OF IT COMPANIES - A CASE STUDY

N. Narsaiah★ T. Satyanarayana Chary★★

*Modernization and expansion of business from one physical nature to another is highly influenced by cost ascertainment methods and the costing system is information system that requires a specific type of information such as direct labour hours and units produced. Cost information is necessary for decision making as managers rely upon the cost for effective operational and strategic decisions. Particularly, for IT companies it is very essential that the ascertainment and management of cost to combat with global competition, hence, Activity Based Costing (ABC) has become a tool in the hands of IT companies to surmount the problems with regard to cost management. The main objective of the paper is to throw the light on the ABC system in IT companies and impact of ABC on profitability vis-à-vis the traditional cost system*

*Keywords: Activity Based Costing, Profitability, Performance*

In the global context, accurate cost information has become crucial for businesses to maintain a competitive advantage over its competitors. However, traditional volume-based cost system is subject to many criticisms due to many flaws as in providing timely, reliable and accurate cost information for decision making. (Gunasekaran 1998, Ruhanita et al., 2006). Kaplan (1988) stated that companies need basically cost systems to perform three primary functions, inventory valuation for financial reporting purpose, operational control for performance and productivity evaluation and individual product cost measurement.

On the other hand, today's companies typically have a wide variety and complexity of products and services, high overhead costs compared to direct labor, an over abundance of data and substantial non product costs (e.g. distribution channels) that can dramatically affect true product cost (Drury 2000). The nature of overhead cost has changed from costs, which are predominantly influenced by volume-related factors to a composition determined largely by non-volume-related factors (Innes et al. 1994). Under such circumstances, instead of revealing problems to tackle and opportunities to exploit, traditional costing systems hide from view problems and fail to identify opportunities. Hence, the continuous research by Turney (1996)

Cooper and Kaplan (1998) proved that Activity Based Costing (ABC) would be a solution. It is emerged in the mid-1980's to meet the need for accurate information about the cost of resource demanded by individual products, services, customers, and channels. It is now widely accepted and being implemented by many companies of

manufacturing and service sector equally.

## About ABC

ABC identifies the cost of all the activities being carried out and then finds a suitable base for allocating those costs to products and services. It is a technique to more accurately assign the indirect and direct resources of an organization to the activities performed based on consumption by a two-stage cost assignment approach. In the first stage, resource costs are assigned to activities based on the amount of resources consumed in performing the activity<sup>2</sup>. In the second stage, activity costs are traced to the products, services, or customers based on how frequently the activity is performed in support of these cost objects.

The CAM-I Glossary of Activity Based Management provides an elaborated interpretation of ABC: "ABC is a methodology that measures cost and performance of cost objects, activities, and resources, assigns resources to activities and activities to cost objects based on their use, and incorporates causal relationships between cost objects and activities as well as activities and resources" (Dierks and Cokins 2001). Hence, ABC is not just about allocating overheads, but it is about managing and controlling activities and consumption of resources that incur cost (Turney 1996 and Cooper and Kaplan 1998). By recognizing the causal relationships among resources, activities, and cost objects such as products or customers, as

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well ABC allows one to identify inefficient or unnecessary activities and opportunities for cost reduction or profit enhancement. More comprehensively we can say that ABC is a cost accounting method it allocates resource costs to products, services, distribution channels, product mix and customers based on activities consumption by them, which the factors are causing to perform work and incurring cost, used by products and services. In other words, ABC assigns resources to products according to the activities and resources consumed in producing, marketing, selling and distributing, delivering and servicing the product to the customers. In this process ABC system main focus is on the activity concept. ABC assumes that activities originate cost and that outputs build the demand for activities. This ABC system is designed to eliminate boundaries among departments (Dugdale 1990; Morrow 1992) and create more exact cost information or disclose 'the hidden profits and the hidden losses' (Argyris and Kaplan 1994).

Thus, ABC method is the alternative to the traditional cost accounting system that can be applied to various manufacturing and service industries for ascertainment of exact and accurate cost. The results of ABC application is found with greater success stories over healthcare, insurance, logistics, construction industry, bio-technology, and transport industries etc.,

## I. Review of Literature

Robin Cooper and Robert S. Kaplan (1992)<sup>1</sup> they inferred that traditional cost systems use volume-driven allocation bases, such as direct labor cost, machine hours, and sales to assign organizational expenses to individual products and services. But many of the resource demands by individual products and customers are not proportional to the volume of units produced or sold. Thus, Traditional cost systems do not measure accurately the costs of resources used to produce products and services to sell and deliver them to customers. Therefore, new method ABC systems emerged, so it can directly link the costs of performing organizational activities to the products and services for which these activities are performed.

Lewis (1995)<sup>2</sup> ABC is often used as a part of total cost management. ABC system differs from traditional system in two ways: first, cost pools are defined as activities rather than production cost centers and secondly, the cost drivers used to assign activity costs are structurally different from those used in traditional cost systems.

A.Gunasekaran, R. Mc NEIL and D.Singh (2000)<sup>3</sup>, entitled "Activity-Based Management in a Small Company",

stated that Production planning & Control of organizations are moving from managing vertically to managing horizontally, while changing of organization Activity-Based Costing and Activity-Based Management provide cost and operating information, that mirror the horizontal view to initiate improvements.

Rocco Paduano and Wesley Harris, Rocco Paduano, WeslHarris and Joel Cutcher-Gershenfeld (2000)<sup>4</sup>, their study on "Activity Based Costing and Management pilot" wrote that majority of the companies that have adopted ABCM operate in the commercial sector. Traditionally, these companies have been perceived to be more exposed to economic variability, and thus must be able to adapt to changing market conditions in order to retain competitiveness. Although stated that aerospace industry has been slower to adopt Activity-Based Costing methods, cycles of instability in the industry may lead to increasing interest in ABCM.

Carles Grifull-Miquel (2001)<sup>5</sup>, study on "Activity-Based Costing Methodology", emphasized that it is very difficult to develop a pure ABC model because the particular characteristics of a single third-party logistics company entailed the use of slightly different ways to allocate several costs in some instances, which a purely ABC approach would not be able to do. Despite this fact, the final model for both sides of the third-party company operations (warehouse and transport operations) has been mainly described by taking ABC analysis into account.

Abdul Adamu (2009)<sup>6</sup>, written on "The Practicability of Activity Based Costing System in Hospitality Industry, JOFAR" inferred that intense competition on price and quality, attention is shifting from standardization to customization of products and services. The traditional costing method has become obsolete because various costs especially overheads are incorrectly allocated to products or services.

### Objectives of the Study

The prime objective of the study is to analyse the Activity-Based Cost system in CTS IT Company. Hence, in order to achieve the prime objective of the study, the following specific objectives are undertaken.

1. To find out the Resources, Activities, Cost Objects, Cost Drivers and Activity Drivers of CTS IT Company.
2. To evaluate the method and current status of ABC in CTS IT Company.
3. To analyse the cost of CTS IT Company through

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identified cost and activity drivers.

4. To compare the profitability of the company based on ABC method and Traditional Cost Method.

Hypothesis

In order to ascertain the objectives of the study the following Hypothesis has been framed and tested:

Ho 1: There is no significant difference between the profits of CTS IT Company computed by

Traditional cost method and ABC.

## II. Research Design & Methods

In order to explore the research questions a case study method, exploratory and descriptive methodology is used for the study. The case problem is CTS IT Company. This research addressed the current state of IT cost management and the extent to which the CTS IT Company was able to practically assess the costs of its IT activities and services. For this purpose the study used to the possible extent the secondary data. The name of the company is disguised and mentioned as CTS IT in the paper as the company requested that not to reveal the organized name. The secondary data was collected from referred journals, articles, magazines of India and foreign origin, On the other hand, sources of secondary data is formed from annual reports, past records and other unpublished works of CTS IT Company. The data analysis was done through ABC frame-work, growth ratios and trend ratios. To examine the authenticity of the findings t-test is employed.

### ABC METHOD AT CTS IT COMPANY

CTS IT Company is accorded as a leader in the global market and among the top 10 technology firms in the world. The company renders Information Technology (IT) services, consulting and business solutions for the benefit of many companies. The services portfolio consists of application development and maintenance, business intelligence, Enterprise solutions, assurance, engineering and industrial Services, IT infrastructure services, business process outsourcing, consulting and asset leveraged solutions.

CTS IT Company introduced ABC along with ISO 9000 to steer the software metrics program. The metrics guidelines, defined in 1993, were meant to achieve quality objectives by monitoring effort, defect, schedule, and size. The ABC system provides a tool for efficient project management. Activities that are essential for executing project tasks

right from the inception are tagged as value-adding effort. Others, such as idle time and rework, are tagged as non value- adding effort and tracked. So CTS IT Company can reduce them, thereby improving productivity and reduce the cost. For instance, idle time could be due to unavailability of resources or the communication link being down.

The concept of cost drivers as the reason for performing an activity is central to this approach. Value-adding cost drivers, such as the number of components requirements, design number of document creation, the number of test cases required for testing, and the number and complexity of program specifications for coding, are normal cost drivers. Activities that create non-value-adding cost drivers, such as client-induced change in scope or delay in acceptance, are not-normal cost drivers. Aggregating costs for non-value adding cost drivers helps the project team both identify wasted effort as the project progresses and take early corrective actions. Therefore one can say that the Activity Based costing method developed by CTS IT Company for IT activities and services is very efficient and suitable one.

ABC method applied by CTS IT Company is all about consisting the cost drivers linkage to implement ABC for IT activities and services. The company Activity Based Costing driver linkage to drive the IT activities to software development and maintain IT services (cost objects). ABC method considering in CTS IT Company is strategic internal cost technique method, therefore, the company divided ABC driver linkage in two ways they are Value adding activities and Non-value adding activities. ABC can estimate cost per activities and services, by this way management can take decision regarding which activities and services are essential and more over the company can eliminate that unnecessary activities and unprofitable services. Cost per activities and services can determine in CTS IT Company by the way of adding non-value added activities also support to develop the software projects and IT services. There after supporting of non-value adding activities to value adding activities to get true cost per activities and services cost. CTS IT Company can avoid non value adding activities from value adding activities to obtain true cost per activities and services. Therefore ABC implementing result in CTS IT Company can reflect to get true cost per IT activities and services.

ABC method implemented results at CTS IT Company found in a way as non-value adding activities that can be classified in two ways as they are Idle Time Driver and Rework Driver. Idle time driver comprise such activities as improper planning, client delays Resource unavailability

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and external factor. Rework driver consisting such activities as Scope creep, Lack of skills, and Non-conformances to process. Value adding activities at CTS IT Company found that namely as Functional Requirement Analysis, Recruitment and Training, Employees Cost, Document Creation, Travelling and Conveyance, Rent, Communication, Keeping Current, Planning & Design, Service of equipments & Programs, Marketing Support, Supervision & Administration. These activities are drive by respective Cost drivers to Cost objects of the CTS IT Company (see the figure 1 for more details).

### ABC ANALYSIS AT CTS IT COMPANY

The ABC analysis of CTS IT Company is analysed and presented on the basis of budgeted activity cost, cost driver and cost objects through tables 1 to 11. ABC as a system basically requires Activities, Cost Pools and Cost Drivers, because, it is an holistic approach at all. Hence, such concepts are explained through table 1 and 2.

## III. Analysis, Discussion & Findings

### (i) Analysis of Activity Cost pools, Cost Drivers Size and Pool Rate of CTS IT Company

The Analysis of Activity Cost pools, Cost Drivers Size and Pool Rate of CTS IT Company from 2008-09 to 2012-13. Functional Requirements Analysis cost is one of the identified activities of IT companies under ABC method, it was 10.29 per cent over the total cost during the year 2008-09, which taken a significant percentage of total cost. Employees cost it can be observed that such cost declined over the years, 2008-09 and 2009-10 by 3.46 and 4.21 percentages respectively caused by IT industry declined during the year 2009-10. On the other hand, Requirement Analysis has escalated very significant in the year 2011-12 by 95.74 per cent caused by tremendously increased sales revenue over the previous years, hence, in the year 2012-13 it was considerable as it reported at 37.18 per cent growth, it is due to the growth in volume in the year 2013 was lower than that of the year 2012 primarily on account of continuing global economic uncertainties and lower discretionary spending by customers / clients. It is very clear that on the whole the requirement cost reported a mixed trend accordingly the fluctuations or the trends of the business.

Document creation cost was Rs. 33.67 Crores, in the year 2008-09 hence, the cost was increased by 61.53 per cent in the year 2009-10 due to expansion of the business. Moreover cost trend in the year 2010-11 declined by 70.27 per cent due to downturn of IT industry in the respective

year. On the other hand, the cost moved upward during the year 2011-12 and 2012-13 as the company extended business to foreign countries. Recruitment & Training cost was Rs. 173.03 Crores, in the year 2008-09, the company reported reduced recruitment and training costs during the financial years 2009-10 and 2010-11 by 30.07 and 7.25 per cent respectively due to the movement of people between and among the nations for providing the high-end technical and business services skills required by the global organizations in the developed markets including USA, UK, Europe, Australia, Japan etc. Thus, the company reported an increased cost of recruitment and training in 2011-12 by 52.17 per cent as well shown a slight increase by 45.89 per cent in 2012-13 due to the dynamics and changing requirements of recruitment and training.

With regard to employee's costs including all costs related to employees compensation, it is found that total cost in the year 2008-09 was Rs. 5961.17 crores, which increased significantly in the year 2009-10 by 23.63 per cent, hence, the cost was not significant increased in the year 2010-11 due to effect of IT industrial crisis of 2009-10, however the cost has moved swiftly in the year 2011-12 and 2012-13 by 78.88 and 70.49 per cent respectively. This can be attributable to increased compensation packages, and effect of exchange variation for foreign currency allowances paid to employees deployed at various overseas locations.

Communication cost reported that it has increased over the five years except in 2011-12 as there was a decrease in overseas business in such year; hence, communication cost registered 11.17 per cent negative growth. Planning and designing cost was Rs. 264.87 Crores in year 2008-09 which has fall down in the year 2009-10 by 16.43 per cent, and it suddenly escalated in the year 2010-11 by 109.74 per cent as the software industry faced huge crisis in the year 2009-10. Aftermath the company merely allocated budgeted cost at 44.24 and 6.28 per cent for planning and design in the respective years 2011-12 and 2012-13.

Project Management and performance cost registered in the total activity cost by 3.03% in the year 2008-09, the cost was moved up in the year 2009-10 caused by time lag in delivery of services. But in the year 2010-11 and 2011-12 it has reported at 8.46 and 19.35 per cent growth as the cost of planning and management reduced. On the other hand, in the year 2012-13 the cost increased by 1.94 per cent due to tremendous increase in sales revenue by 28.82 per cent. Operation support and Technical support cost has registered increase trend in all the financial years, except in 2010-11 as in such year the cost was decreased by 3.64 and 68.77 per cent respectively.

Keeping current cost was Rs. 158.22 crores in the year 2008-09, which is almost 1.52%, in total activity cost. This cost tremendously increased in the years 2009-10, 2010-11, 2011-12 and 2012-13 by 24.02, 19.10, 24.97 and 62.87 per cent respectively caused by growth in revenue, therefore, to meet the business expansion keeping current cost is essential. Cost of setup and configuring and support for user has been increased over all financial years, but, the cost was found to decrease in the year 2011-12 due to the continuing investments in information technology, process maturity and deep domain expertise that have resulted in superior outcome for clients. Service of equipments and programs (maintenance and repairing) cost reported a continuous increase in all the financial years caused by the services supplied to the clients as per agreement, hence, the cost registered over all years trend was an increasing one. Travelling and conveyance and Supervision & Administration cost was over the total activity cost by 4.04 and 3.34 per cent respectively. The cost during the years 2009-10 and 2010-11 declined due to downturn of IT sector. Moreover the cost moved up during the years 2011-12 and 2012-13 due to increased export revenue through services, which has increased.

It can be found that the company marketing support activity cost continuously increased allocation of resource even during the IT crisis period, but, the cost except in the year 2012-13 decreased by 15.36% caused by the activity collected more revenue through the sale of the services, therefore, it led to show the strength by the company to outsider. Advertisement and Sales promotion cost was Rs. 169.48 Crores, in the year 2008-09. This cost in the 2009-10 and 2010-11 has increased by 93.80 and 188.93 per cent due to the financial crisis effect. On the other hand the cost has decreased in the year 2011-12 by 83.93 per cent due to the company revoked the cost during the year, and finally the cost has slightly moved up in the year 2012-13 by 17.35% caused by the growing revenues through IT services.

#### (ii) Cost Analysis of CTS IT Company under Traditional Cost Method (TCM)

Cost analysis of the CTS IT Company, under traditional cost method. Inventory which includes Raw materials, sub-assemblies and components increased in 2009-10 over the year 2008-09 by 11.42%, but in the fiscal year 2010-11 suddenly it fell down by negative growth rate of 64.65 per cent due to the global economic crisis and the volatility of IT industry. The period of crisis was used by the Company for revamping its internal business processes, without losing focus on delivering value to customers and growth

with profitability for the company, therefore, the company inventory growth was negative. Inventory in the fiscal year of 2011-12 tremendously increased because during the year raw materials, sub-assemblies and components are carried at the lower cost available and in the fiscal year of 2012-13 the company had not purchased more, so, it shows 50.70 growth per cent.

Employees costs include salaries that have fixed and variable components, contribution to provident fund, superannuation fund, gratuity fund and the employees insurance schemes etc, which constitute in total employees cost was Rs. 5961.17 Crores in fiscal year 2008-09, which increased in fiscal year 2009-10 by 23.63 per cent due to increased headcounts and increase in compensation package. This cost was increased in year 2010-11 by only 6.95%, but in the year 2011-12 it was very rapid increase as higher salaries and incentives to employees took place in India due to the increase in the number of employees. Total employees related expenses have increased by 70.49% from Rs. 14,100.41 crores in fiscal year 2011-12 to Rs. 24,039.96 crores in year 2012-13. However, the company Prime cost during the year 2008-09 was Rs. 5973.51 Crores, which has registered growth in the year 2009-10 by 23.60%, but the growth in the year 2010-11 was 6.81% only, hence, the growth rapidly escalated during the year 2011-12 by 78.94%, once again the growth had reported in the year 2012-13 by 70.37% caused by the expanded business in India and abroad.

Factory cost include rent and electricity expenses of CTS IT Company has been found in increasing trend as the rent cost and electrical cost as a per cent of revenues went up from 59.96% in the year 2008-09 to 80.99% in 2012-13 due to additional space occupied and electricity cost that commensurate with growth of business. Under administration overheads, in 2008-09 the cost was Rs. 173.03 crores, which declined in the year 2009-10 and 2010-11 due to downturn of the economy and IT industry. Recruitment and training cost increased in remaining years as IT Industry improved. Hence, the cost of production has increased from Rs. 10104.35 Crores in the year 2008-09 to Rs. 30319.62 Crores in 2012-13, as the administrative expenses increased, due to the slow growth of global economy. Despite the good signs of faster growth in certain geographies, primarily in the emerging markets in few years the cost was escalated.

On the other hand, Marketing support expenses increased from 2008-09 to 2011-12 in accordance with revenue. It is due to increase in software license cost in the year 2012-13, Travelling and convenience expenses, Advertisement

and Sales promotion expenses the cost of Sales moved towards upward very significantly, whereas, Travelling and convenience cost after the financial crisis, the company during the years 2009-10 and 2010-11 emphasized to reduce. Therefore, finally cost of sales of the CTS IT Company in the year 2008-09 was Rs. 10932.71 Crores that moved upwards in the year 2009-10 by 16.55%, hence, 2010-11 the cost of sales increased by 9.72% in the year 2010-11. The cost once again moved with rapid changes in the 2011-12 by 43.34 per cent and in 2012-13 by 58.23% as the sales revenue of the company increased significantly.

(iii) Profit Analysis and Comparison of CTS IT Company under Traditional Cost Method (TCM) and ABC method

Through the Profit analysis and comparison of CTS IT Company under Traditional Cost Method (TCM) and ABC method is done. The total sales revenues of CTS IT Company Service Rs. 27,812.88 Crore in the year 2009-10 as compared to Rs. 22,619.52 Crore in the year 2008-09, registered at growth of 22.95%. The sales revenue has been significantly increasing in trend, hence, the sales become more than double in 2012-13 when compared to sales trend of year 2008-09. It is found that the total cost through traditional cost method rapidly increased in every financial year, especially in year 2012-13, which has registered 290.10% trend ratio in the same year sales revenue trend ratio was 278.47%, it means, the cost is more than the sales revenue. Total cost of CTS IT Company through ABC method in year 2008-09 was Rs. 10,805.19 Crores where as in the year 2012-13, it was Rs. 32,628.44 Crores. It is found that the cost becomes thrice in fiscal 2012-13, however, cost by ABC method in 2008-09 and 2009-10 reported decreasing trend over the Traditional cost, but in the years 2010-11, 2011-12 and 2012-13 ABC cost was higher than traditional cost.

It is clear that the profit under traditional cost method was Rs. 11,686.81 Crores in the year 2008-09 that has moved to Rs. 31,272.79 Crores in the year 2012-13. It can be asserted that the profit of CTS IT Company moved very slowly till 2010-11 and very significantly moved up in 2011-12 and 2012-13. On the other hand profit analysed under ABC method states that a steep growth is there in the profit volume right from the year 2008-09 and 2009-10 and profit fell down in the years 2010-11, 2011-12 and 2012-13. Hence, the excessive profit reported by ABC over traditional profit was Rs. 127.52 in the year 2008-09 which is equal to 1.16% over traditional profit, Rs. 163.32 Crores in the year 2009-10 which is equal to 1.28% over traditional profit, In the year 2010-11 profit fall down by

Rs. 230.36 Crores which is equals to 1.64% decrease over the traditional profit. Rs. 205.15 Crores in the year 2011-12 fell down in the profit volume which is equal to 1.02% and finally in the year 2012-13 Rs. 911.75 Crores fell down which is equal to 2.87% decrease. It can be inferred that the ABC method generated mixed results in terms of profits, hence, ABC can help to IT companies in getting higher profits by controlling the cost very particularly. However, ultimately we can say that the ABC is superior method in terms of profitability and cost controlling point of view over the Traditional Cost Method.

Profits of CTS IT Company obtained through Traditional cost method and ABC during the study period were taken to find whether there is a significant difference between the profits of company computed by Traditional cost method and ABC through t-Test (See table 3).

Through t-Test at 8 degrees of freedom at 5% level of significance, it is found that the one -tail value is 0.485111485 and two-tail value is 0.97022297, which is less than the critical value of one -tail 1.859548033 and two-tail 2.306004133, hence, the null hypothesis is accepted as the values are under the critical value. So it can be concluded that there is no significant difference between the profits of CTS IT Company computed by Traditional cost method and ABC. It is clear that the ABC can work as a corrective factor of the profits of IT companies as it is able to accurately ascertain the cost based on resource consumption by various activities of the organizations.

#### IV. Conclusion

ABC implementation in IT companies can underpin the planning process through effectively linking proposed expenditures with outputs. The outputs or activities would be identified as part of the annual planning and negotiating cycle, and data that obtained through ABC provides a higher level of understanding about the budget consequences of the IT companies for the choices made and decisions taken. IT companies grow very fast, so they are quickly forced to adopt a strategic cost accounting system as ABC. IT companies are not burdened by any IT legacy and reach the level at which ABC could suit their needs quite fast. Though the ABC method is not superior to Traditional cost method but is able to give accurate cost through a rigorous system, it enables the organizations to realize the real profitability that could not be done by traditional cost methods. Nevertheless, as the IT companies are particularly interested in areas like strategic management of organizational life cycle, research & development, marketing and sales, they need to focus on Activity Based

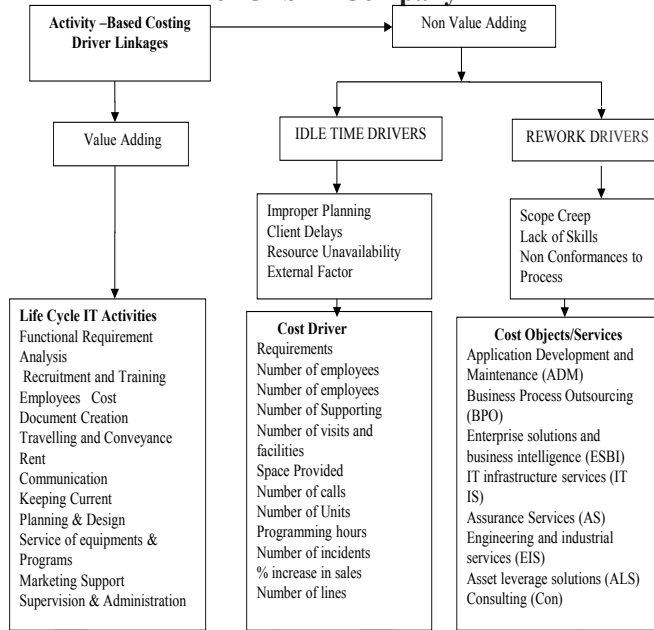
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Costing for betterment and precision in cost ascertainment and profit planning.

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**Figure 1: Activity-Based Costing Method of CTS IT Company**



Source: K R Lakshminarayana, Chief Strategy Officer at Wipro, (12 Feb 2009)

**Table 1: Identified Activities, Activity Cost Pools and Cost Drivers of CTS IT Company**

Identified Activities	Activities Cost Pools	Cost Drivers
Functional Requirement analysis	Functional Requirements Analysis	Number of PCs, Hard ware and Peripherals
Recruitment and training	Recruitment and training	Number of employees Recruited and Trained
Employees Cost	Legal and professional fees	Number of employees
1. Communication 2. Support for users	Support for users	Number of calls /Number of mails
Travelling and Conveyance	Travelling and Conveyance	Number of visits and facilities / Number of Kilometers
Rent	Rent	Space Provided
Service of equipments and Programs (maintenance and repairing)	Repairs and Maintenance	Number of incidents
Keeping Current	Keeping Current	Number of Units
1. Planning and Designing 2. Project Management and Performance 3. Technical Support 4. Setup and configuring	Develop new programs	Programming hours
1. Document Creation 2. Operation Support	Operation Support	Number of Supporting
1. Marketing Support 2. Advertisement and Sales promotion	Marketing	% increase in sales
Supervision & Administration	Supervision & Administration	Number of lines

**Table 2: Identified Cost objects /Services**

Application development and maintenance (ADM)
Business process outsourcing (BPO)
Enterprise solutions and business intelligence (ESBI)
IT infrastructure services (IT IS)
Assurance Services (AS)
Engineering and industrial services (EIS)
Asset leverage solutions (ALS)
Consulting (Con)

Source: Financial Reports and Website of CTS IT Company from financial year 2008-09 to 2012-13

**Table 3: Profits of CTS IT Company through Traditional cost method and ABC**

Financial Years	Profit/Loss by Traditional Cost Method	Profit/Loss by ABC Method
2008-09	11,686.81	11,814.33
2009-10	15,069.92	15,233.24
2010-11	16,046.11	15,815.75
2011-12	28,849.65	28,645.03
2012-13	31,272.79	30,361.04

t-Test: Two-Sample Assuming Equal Variances		
	Variable 1	Variable 2
Mean	20585.056	20373.878
Variance	78182177.45	72155978.02
Observations	5	5
Pooled Variance	75169077.74	
Hypothesized Mean Difference	0	
Df	8	
t Stat	0.038512265	
P(T<=t) one-tail	0.485111485	
t Critical one-tail	1.859548033	
P(T<=t) two-tail	0.97022297	
t Critical two-tail	2.306004133	

## USE OF SOCIAL MEDIA AS A RESEARCH TOOL A STUDY AMONG RESEARCHERS IN KASHMIR VALLEY

Ursil Majid Makhdoomi★ Salsabeel Nazir★★ Waseem Jahangir★★★

*The intense penetration of Information and Communication Technology has transformed our way of living and thinking, leading to the emergence of Social Media. Social media can be used for many purposes like for social interaction, news update, business, etc, yet it's full potential is not tapped. Being a bandwagon concept, its usage within research scholars is scarce. One of the most vital needs of researchers is to acquire, use and disperse the information, and social media tools provide that facility. These have the ability to disseminate the information in a very efficient way. The focus of this paper is to analyze the usage of various social media tools for research purpose. The study has been conducted on the research scholars from various departments of different universities in Kashmir valley. Both primary and secondary data has been used in the research. Primary data was collected through a structured questionnaire adopted from previous research which was modified accordingly. The sample size of 80 research scholars has been selected for this study through random sampling technique. The results revealed that the social networking is mostly used tool and for the research purpose researchers use E-mail and Research Gate. The results also show that majority of the population use it for research work and that too for reviewing the literature and data collection. It was also exhibited that the most important reason for the use of Social media tools were their access to wider range of information and ideas.*

*Keywords: Social Media, Research Scholars, Information and Communication Technology, Kashmir*

With the proliferation of Internet and other ICT (Information, Communication Technology) innovations, media has transcend all forms of communications and one such form is Social Media. Social Media make use of Internet and enable the user to create the content thyself and share it with vast number of people across the globe, unlike the other forms of media like news media, where the content is created by editors or journalists to mass communicate. Facebook, Whatsapp, Emails, Research Gate, Twitter, Wikis, Skype, LinkedIn, Instagram etc are famous and extensively used Social media either for social networking or educational purposes.

Few forms of the Social media represent to a specific or niche market where only specific users following that interest uses it, example LinkedIn, where people with professional background creates an account and get in touch with other professionals either sharing same interest or different. Similarly Facebook is a social networking site; user creates an account and can be friends with people from all over the world. The technological factors like broadband service, smart laptops and mobile phones, advanced software's play a very dominating role for its widespread and multiple usages. Social media offers variety of benefits as there is no clear separating line between consumers and producers, (Jonathan Bright et.al, 2014). At present number of social media sites are in use where the user interacts, contribute, share and avail

information, hold conversations, get to know different people etc. These all are the basic features for which these sites are created, but apart from them other multiple benefits they offer like enable the researcher from varied fields to avail information, interact with other researchers belonging to different parts of the world, and get to know their ideas and opinions, otherwise their concepts would be unrecognized and obsolete.

Social Media has been within click to all users which is the main reason for increased number of social media users. As of statistical report of 2015, there are 350 million Internet users in India and 10 percent of the total population i.e. 134 million people are using social media (IAMAI, 2015), showing an increase in the user base as compared to previous years.

### Social Media and Education

Social media tools can also be used as a Micro Blogging

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sites which is not like traditional blog. In these short texts, images and videos are shared with the other users, few of these sites offer privacy policy as who can view your uploads. These have transformed the way as how the messages or information can be consumed. Millions of users are engrossed with these tools of social media either on smart phones or computers, and the academician seems to have trapped its potential by using it for educational purposes. As per the previous research conducted by Topuniversities.com, many students acknowledged that they use micro blogging sites (e.g. Twitter) for discussion, queries and for knowing others view point. From the researchers point of view for using the social networking sites (e.g. ResearchGate, Academia) it gives more citations to the publications, view of Scholarly articles, answers to their problems, alerts of different conferences and workshops across the globe etc. It also brings researchers, professors and other scholars belonging to varied disciplines together. The most important benefit for research purpose offered by Social media is collection of data often taking entire population into consideration. The data thus collected swiftly, efficiently and electronically enables the analysis, gathering and storing of data in a digital form. Increasing users of social media means that the researchers would be having access to the participants and thus giving a cross-culture perspective.

## I. Review of Literature

Communicating by means of social media has become major trend nowadays, whether among students, academicians, researchers or professionals etc. People have started using different forms of technology from a wide variety of purposes among which one is research. Social networking now has become a part of culture (Boyd, 2008). Organizations have been using social media to provide research based information in order to reach a wide range of people and increase their influence.

### Social Media Tools

Kaplan and Haenlein (2010) have grouped social media applications into six distinct categories:

- Collaborative projects (wikis, social bookmarking)
- Blogs (including Twitter)
- Content communities (YouTube, Flickr)
- Social networking sites (Facebook)
- Virtual game worlds (World of Warcraft)
- Virtual social worlds (Second Life)

There are many other categories as well like Voice over Internet (VoIP) Applications, Discussion Forums/

Platforms, Academic Social Networking Sites, Audio Sharing Applications, Online Mapping Tools, Cloud Storage Applications etc. There are many systems developed only for education with many desirable features, like forums, file sharing, video conferences, shared whiteboards, wikis, etc. There are non research media platforms as well as research media platforms available over the internet. Non-research media tools include Facebook, LinkedIn, twitter etc. The top 4 social media websites in December 2014 included (1) Facebook, (2) YouTube, (3) Google Plus, and (4) Twitter (Statistica, 2014). There are also platforms, academic social networking sites like ResearchGate, Mendeley, and Academia etc. that are specifically designed for researchers.

### Social Media Adoption for Research

Social Media has been the quickest way to diffuse information to a huge population. The major use of social media nowadays is focused on Public Relations (PR) but its use for research related purpose is still in the developing, though with great potential. Technology has affected our way of working, communicating, gathering information, spending time, making decisions etc. These changes have also affected the research world, researchers have begun to use internet to perform researches and used it as a cyber laboratory for their researches (Kayam et al., 2012). Researchers' choice of using the social media platforms depends upon their habits and also their method of work (Kichanova, 2012). It has been found that social networking has many desirable features which could be beneficial to learning (Horizon Report, 2008). People use networks like LinkedIn, Facebook etc. not only for keeping contact with family and friends but also for questions, queries, opinions, suggestions etc. (Thomas et al., 2014). Online research networks and communities help in enabling new forms of engagement with the research field, often beyond the immediate scope of thesis-related work, and contribute to the act of mapping the research field by providing additional insights (Coverdale, 2011). Researchers can use social media to promote their profile, connect with people from the same field and also stay on top of their citations (Darina, 2015).

The research workflow shown below comprises of the following phases (CIBER-2010)

- Identify research opportunities
- Find collaborators
- Secure support/funding
- Review the literature
- Collect research data
- Analyze research data

- Disseminate/publish research findings
- Manage research process

There have been many studies which show researchers have been making use of the social media tools in the different phases of their research workflow. Conservative researchers use web 2.0 for their researches (Minocha and Petre, 2009). A study of researchers from 215 countries by CIBER, the University College London and Emerald Group Publishing Ltd. (2010) revealed that researchers have been using social media in every phase of their research. Researchers have been using social media for activities like collaborating authoring, conferencing, scheduling and meetings (Rowlands et al., 2011). Researchers have not been using just one social media tool, but different social media tools at the same time. They have been mostly using the generic social media tools which are already popular and making less use of tools designed for research related purposes (Rowlands et al., 2011). Please see figure 1.

Social media has been seen to have an impact on the work of researchers mostly in improving their professional network and making themselves visible among the research community, but usage of social media in dissemination and visibility of research results has been found to be very less (Chisenga, 2013). Please see Table 1.

#### Frequency of usage of Social Media for Research

There are thousands of forms of networks available nowadays and most of them are free to join. According to recent studies it was found that Facebook and twitter are the two biggest social networking sites in the field of higher education. Facebook was also reported to be the most used Social Networking Site in higher education (Barnes & Lescault, 2012). Researchers are using various social media tools among which the most commonly used tools are blogs, Facebook, Wikipedia, Skype, LinkedIn and Twitter (Chisenga et al., 2013). Facebook and LinkedIn are reported to be the most used sites by researchers (Rowlands et al., 2011). Over 2 million researchers are currently using social media (research) tools like Research Gate and Academia.edu, and many others are using social media tools such as blogs, SlideShare etc. (Brandtzæg, 2014). ResearchGate has over 1.9 million members from 193 countries (ResearchGate 2012.)

#### Importance of Social Media in Research

With the evolution of technology and internet, social media has gradually taken over all field of life. It plays an important role not only in daily work life but also in business, education as well as research. The platforms of

social media that are used by researchers are important to them in many ways like gathering, sharing and exchange of information, to stay updated with new knowledge and research, find ways and solution to problems, connect with other researchers and professionals (Kichanova, 2012). There has been an increase in their use and importance because they are easy to use, fast, available, democratic and life facilitating means of communication and they are limitless while other means of media are limited in one or the other way, thus it improves efficiency and speeds up work (Kichanova, 2012).

#### Objectives of the Study

1. To analyze the usage of social media for research.
2. To assess the preferred form of social media for research.

## II. Research Design & Methods

The research was confined to the major universities of Kashmir Valley. The data collected for the study through a structured questionnaire adapted from a previous research and modified accordingly. The study made use of both primary and secondary data. Random sampling technique was adopted to determine the sample size. The data for the study were collected from 80 respondents. See Figure 2.

#### Instrument

The survey questionnaire consisted of 13 items divided into two parts. Part A consists of 4 demographic questions about the respondent's age, gender, discipline of research and mode of settlement. This part attempts to find out whether these have any impact on the adoption and usage of the social media tools. Part B comprises of 9 items which focus on gathering information about use of social media tools in different research phases, frequency of use and adoption of social media tools and their benefits.

## III. Results & Analysis

The Statistical Package for the Social Science (SPSS) VERSION 16.0 was used to analyze the data. Descriptive statistics and one way ANOVA was used to analyze the collected data.

#### Descriptive Statistics

##### Demographic Distribution

The Age, Gender, type of settlement and research discipline classification, presented below giving an overview of the research sample. Age group 25-35 was the largest group representing 81.3% of the respondents, followed by 16.3%

of respondents who belonged to the age between 30-35. The smallest number of respondents belonged to the age group of 35-40 and above 40 with both representing a percentage of 1.3% individually. Please see Table 2.

Out of the total number of 80 respondents 45 were males representing 56.3% of the sample and 35 were females representing 43.3% of the sample. Please see table 3.

The sample consisted of researchers from various disciplines among which the highest number of researchers were from the discipline of social sciences (36.3%), followed by business and management (27.5), Computer Science (13.8), Arts and humanities (12.5), and Mathematics (10%). Please see table 4.

#### The usage of social media in Research

The tables below represent the usage and the adoption of social media for research. Out of 80 respondents, the overwhelming majority of 79 respondents i.e. 98.8% were such who used social media for their research purposes and only 1.3% did not consider the use of social media for their research. Please see Table 5 & Pie Chart 1.

#### Type of tools used for Research

The study revealed the type of social media platforms used in particular by the researchers and the kind of tools they especially use for their research purposes. The social media tools used by researchers the most was found to be the social networking tools, followed by Image and video sharing tools and collaborative tools. Please see Table 6 & Pie Chart 2.

The pie chart above represents the social media platforms mostly used by researchers for the purpose of research. It depicts that the most used platform for research is emails, followed by ResearchGate, Wikipedia and Facebook. And among the least used for research were blogs, LinkedIn and Slide share.

#### The Frequency of usage of Social Media in Research

As per Table 7, most of the researchers (43 respondents) used social media platforms on a daily basis. 20 people use social media at least a few times a week. 7 people responded that they use social media accounted to a few times a month and 10 people stated that they occasionally used social media for research purposes. Please see Chart 3.

#### The Importance of Social Media in Research

76 respondents i.e. 95% of the sample consider the use

of social media for research is important and the rest 5% consider it as unimportant. Please see Table 8 & Chart 4.

#### The Use of Social Media in different Research Phases

For every individual research phase, the total mean of every dimension was calculated in order to know in which phase social media is mostly used. Please see Table 9.

The mean for "Reviewing of Literature" was found to be 3.69 which is the highest among the other phases, indicating that the social media is mostly used for reviewing the literature. The total mean of "Collecting research data" phase was found to be 3.56 indicating the second phase for which social media is mostly used. According to the means of various other phases it was found that the next phase for which social media was mostly used is for Research Collaboration followed by disseminating the research finding, Identifying Research Opportunities and Managing the Research process. The use of social media is least for analyzing the research data.

The impact of demographic factors on the usage of social media in different research phases was calculated and to compare the means one way ANOVA was used as shown in the Table 10:

The (p) significance value for Usage of social media in different research phases with gender was found to be .408 which is more than .05. Hence gender differences do not have any significant impact on usage of social media in different research phases. Please see table 11.

The (p) significance value for Usage of social media in different research phases with Research discipline was found to be .409 which is more than .05. Hence research disciplines do not have any significant impact on usage of social media in different research phases. However the descriptive results reveal that Business and Management researchers make use of social media in different phases of research the most, followed by researchers from the disciplines of computer science and arts and humanities. Please see Table 12.

#### Adoption of Social Media for Research

The table 13 shows the means of different reasons for the adoption of social media. It reveals that researchers make use of social media for research because they consider it as a platform which provides access to a wider range of ideas and information (Mean=4.05). The other important reasons for the adoption of social media were found to be, speed of feedback and results, to gain insights and low communication costs with means of 3.35, 3.34 and 3.31

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respectively. The least important reason for the adoption of social media was found to be Direct Communication with a mean of 2.82.

#### Benefits of using Social Media in Research

Among the total sample of 80 respondents, 24% were of the view that the most beneficial factor for using social media for research is that it helps to communicate internationally. 16% consider it beneficial because it helps them in higher visibility and it provides greater access to research content. 15% respondents consider it beneficial as it helps them connect with people outside their academy. Please see Chart 5.

While a smaller percentage of respondents consider it beneficial for providing the attraction to more citations, the ability to cross disciplinary divides and ability to target research communities

### IV. Conclusion

With this paper, we still are at the initial stage for understanding the social media use for research work, but the boundaries for conducting research offline and online have been blurred and technically opened many possible avenues for conducting research flexibly. As per the literature review, studies has been conducted on the impact of social media tools on various aspects like on the mental health of kids, its use among college students for higher education, use for research purpose etc. but still in-depth work and it's usage among researchers is not fully exploited in majority of countries and disciplines. The results of the study revealed that majority of the researchers used social media for research purpose. The platform that they use for their research is social networking and least used are Bookmarking tools. E-mails are the major form that is used for research purpose followed by Research Gate and majority of the population believes that these tools are useful for research purposes. The study also reveals that majority of the researchers use social media on daily basis for their research related concerns and majority of them find it important for their research.

As the different ways of research are concerned, researchers make use of social media mostly for reviewing of literature, collecting the research data and for research collaboration. The most influential reason which drives the researchers to use social media in their work is that it provides access to a wider range of information and ideas. The factors which the researchers considered as most beneficial are that it helps them to communicate internationally, giving them greater access to research content and simultaneously

gives them higher visibility through citations.

The results from the analysis also depicts that gender and disciplines doesn't play any significant role when it comes to the use of social media tools among different research phases. However when it comes to the factors of Social media adoption gender influence is significant whereas disciplines role in the drivers of social media is not much influential.

#### Limitations of Study

The sample size of the study was restricted to Kashmir Valley and to a limited number of researchers and disciplines, the reason being limited time. The data for the present study were collected through questionnaire due to which the generalization of the finding is not applicable to any similar situation.

#### Future Study

The future study can be done in detail on particular platforms of social media that currently exist especially for researchers, considering their different useful features and features that act as a barrier in the work of researchers. The study can also be focused on improving access and quality of the information that is available in such platforms. Workshops and other awareness programs should be conducted so that researchers from other disciplines who don't use the multiple features of SMT's make good use of it.

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**Table 1: Types of digitally-mediated Research Activities**

Research Activities	Tools/Venues	Focus
Updating	Twitter, Facebook	Searching for relevant materials
Networking	Email, Facebook, research-focused SNS	Seeking research bonds for future collaboration
Disseminating	Academia.edu, LinkedIn, Twitter, blogs	Building reputation
Discussing research issues	ResearchGate, LinkedIn groups, Skype	Increasing Self Confidence
Pursuing personal development	MOOCs, YouTube	Expanding knowledge and first hand experiences

**Table 2: Age-wise Distribution**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25-30	65	81.3	81.3
	30-35	13	16.3	97.5
	35-40	1	1.3	98.8
	Above 40	1	1.3	100.0
	Total	80	100.0	100.0

**Table 3: Gender-wise Distribution**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	45	56.3	56.3
	Female	35	43.8	100.0
	Total	80	100.0	100.0

**Table 4: Research Discipline-wise Distribution**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Social Science	29	36.3	36.3
	Mathematics	8	10.0	46.3
	Computer Science	11	13.8	60.0
	Arts and Humanities	10	12.5	72.5
	Business & Management	22	27.5	100.0
	Total	80	100.0	100.0

**Table 5: Social Media Usage or Research**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	79	98.8	98.8
	no	1	1.3	100.0
	Total	80	100.0	100.0

**Table 6: Social Media Tools Used For Research Purposes**

		Responses		Percent of Cases
		N	Percent	
Social Media Tools	Social Networking	56	29.5%	70.9%
	Blogging	15	7.9%	19.0%
	Collaborative Tools	31	16.3%	39.2%
	Bookmarking Tools	13	6.8%	16.5%
	Scheduling Tools	14	7.4%	17.7%
	Conferencing Tools	27	14.2%	34.2%
	Image & Video Sharing Tools	34	17.9%	43.0%
Total		190	100.0%	240.5%

a. Dichotomy group tabulated at value 1.

**Table 7: Frequency of Use**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Daily	43	53.8	53.8
	Weekly	20	25.0	78.8
	Monthly	7	8.8	87.5
	Occasionally	10	12.5	100.0
	Total	80	100.0	100.0

**Table 8: Importance in Research**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Important	76	95.0	95.0	95.0
	Not Important	4	5.0	5.0	100.0
	Total	80	100.0	100.0	

**Table 9: The Use of Social Media in different Research Phases**

	N	Minimum	Maximum	Mean	Std. Deviation
Identifying Research Opportunities	80	1	5	3.06	.876
Managing the Research process	80	1	5	3.06	.998
Analyzing the Research Data	80	1	5	3.00	1.302
Disseminating the Research findings	80	1	5	3.14	1.156
Collecting research data	80	1	5	3.56	1.271
Research Collaboration	80	1	5	3.35	1.080
Reviewing the literature	80	1	5	3.69	1.356
Valid N (listwise)	80				

**Table 10: Social Media & Research Phases with Gender-Phases**

Research Phases	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.700	1	18.700	.691	.408
Within Groups	2110.787	78	27.061		
Total	2129.488	79			

**Table 11: Social Media & Research Phases with Research Discipline**

Research Phases	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	108.538	4	27.134	1.007	.409
Within Groups	2020.950	75	26.946		
Total	2129.488	79			

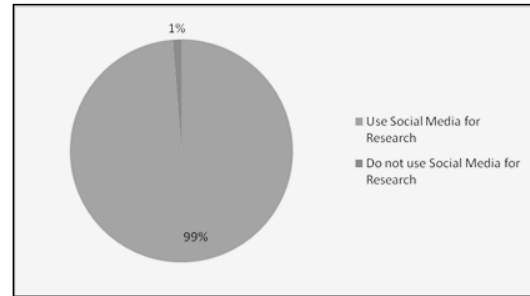
**Table 12: Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Social Science	29	21.7241	5.13320	.95321	19.7716	23.6767	7.00	31.00
Mathematics	8	21.6250	4.30739	1.52289	18.0239	25.2261	16.00	28.00
Computer Science	11	23.9091	4.59248	1.38469	20.8238	26.9944	13.00	31.00
Arts and Humanities	10	22.8000	5.97774	1.89033	18.5238	27.0762	12.00	33.00
Business & Management	22	24.3182	5.43697	1.15917	21.9076	26.7288	13.00	35.00
Total	80	22.8625	5.19187	.58047	21.7071	24.0179	7.00	35.00

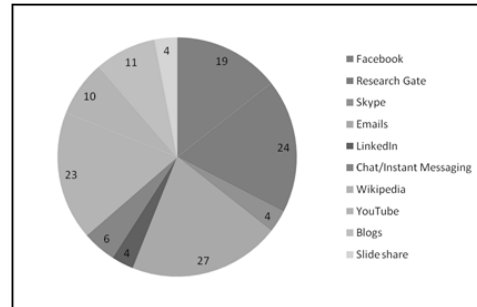
**Table 13: Adoption of Social Media for Research**

	N	Minimum	Maximum	Mean	Std. Deviation
Direct communications	80	1	5	2.82	1.088
Low communication cost	80	1	5	3.31	.963
Speed of feedback and results	80	1	5	3.35	1.080
Gain Insights	80	1	5	3.34	1.169
Access to a wider range of Information and ideas	80	1	5	4.05	1.221
Valid N (listwise)	80				

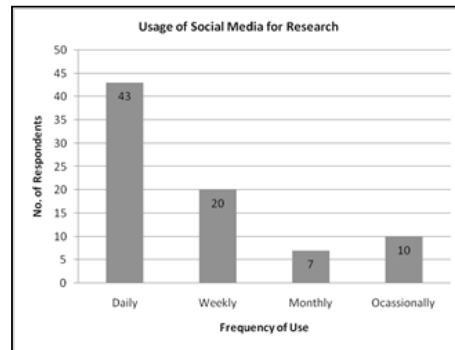
**Chart 1: Social Media Usage or Research**



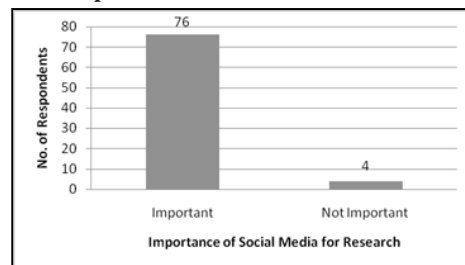
**Pie Chart 2: Social Media Sites used for Research**



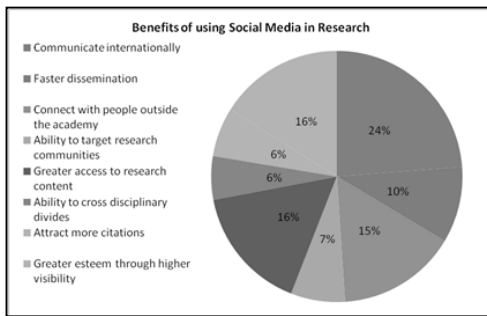
**Chart 3: Usage of Social Media for Research**



**Chart 4: Importance of Social Media for Research**



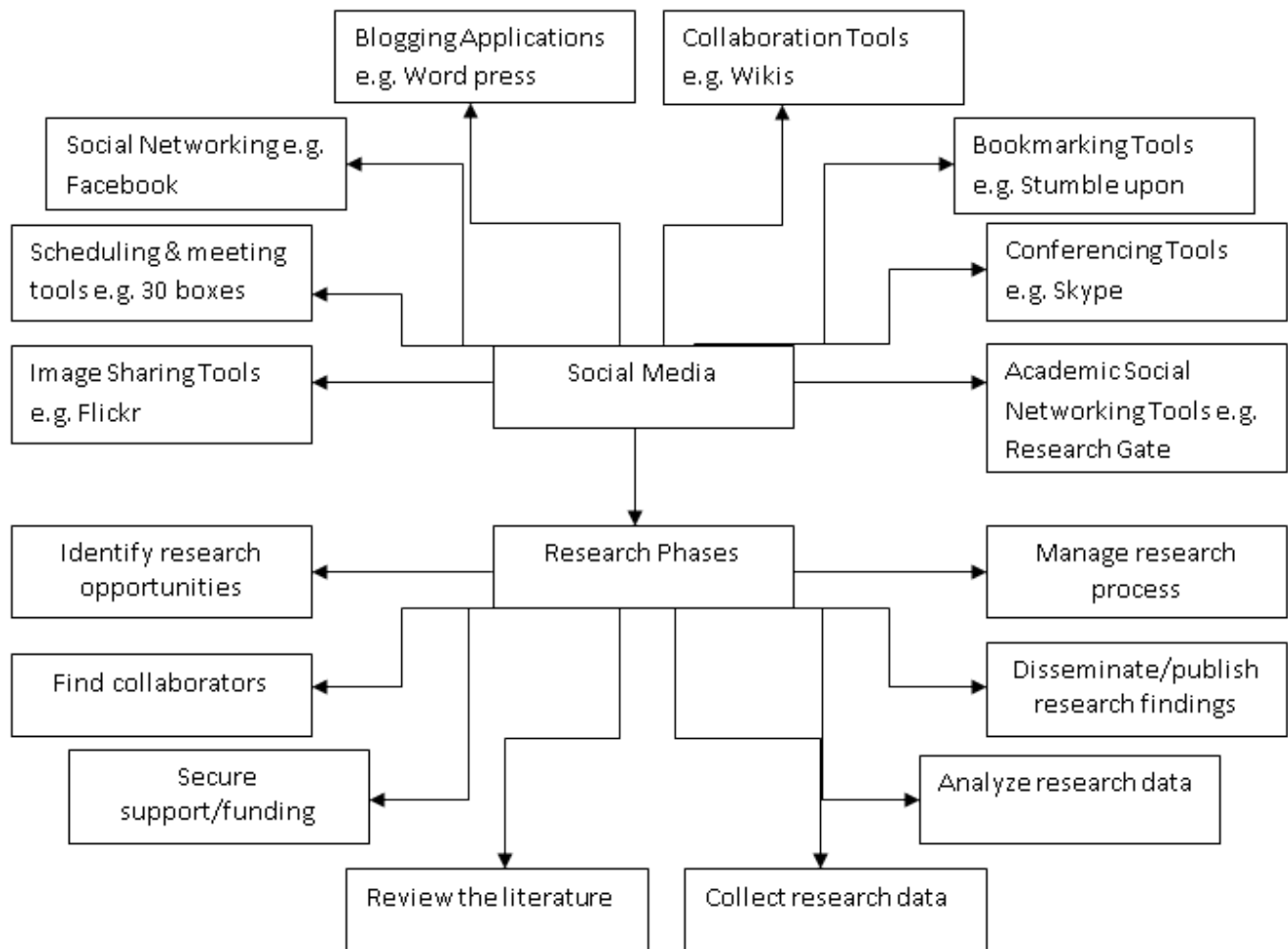
**Chart 5: Benefits of using Social Media in Research**



**Figure 1: Research Workflow- Adapted from CIBER-2010**



**Figure 1: Research Framework**



# FINANCIAL RE-ENGINEERING: AN INNOVATIVE INITIATIVE FOR FINANCIAL INCLUSION

Rinki Rola★ Vinod Varghese★★

*Financial Re-engineering is designing of the financial instruments, process and policy customized to the needs of client base. This can help Financial Institutions to move a step ahead in bringing the economically marginalized populace towards prosperity by bringing them actively in financial system. For this financial institutions should concentrate on the problem faced by these clients in availing the finance facilities and should re-engineer the current financial instruments or should innovate new financial instruments to tap the available market efficiently. The study is based on secondary data collected from the recent studies in various parts in India. The research paper discusses the reviews of financial inclusion studies in India to identify how it serves the inclusive economic growth in the country. Also it attempts to suggest certain tools through financial re-engineering and innovations to advance a level in direction of financial inclusion. One such innovative instrument that can be developed by micro insurance companies is providing in kind benefits instead of cash benefits during the claims. Designing composite products that includes a combination of different micro financial instruments can also be helpful for improving the financial inclusion. Digitizing payments is also an important step forward towards financial inclusion.*

*Keywords: Financial Re-Engineering; Financial Inclusion; Micro Credit; Digital Payments; PMJDY; Inclusive Growth*

Financial inclusion, at its most basic level, starts with having a bank account. But it doesn't stop there - only with regular use do people fully benefit from having an account. Both these outcomes can be difficult to achieve. Economically marginalized people also have a diverse set of financial needs as others. Still, not much work is done to study the financial services needs of them. It is important to better understand their needs, aspirations and behaviors in order to reach and satisfy these clients successfully. The financial reengineering of the financial products and services and process can help to achieve this. Over the past few decades we have also learned that poor households need access to the full range of financial services to generate income, build assets, smooth consumption, and manage risks - which a limited microcredit model cannot provide. The global financial inclusion agenda recognizes these broader needs. To advance financial inclusion, there is a need for continued product and business model innovation so that more people can access a broader range of products at lower costs. According to Financial Engineering and Banking Society, financial re-engineering is a process to innovate, design, develop, offer and implement the financial products and processes, in order to find a solution to the problems in finance or to satisfy a financial need. This involves offering a creative financial product or a financial process to satisfy the need of a customer.

## I. Review of Literature

### 1.1 Introduction to Financial Inclusion

Mehrotra et al. (2009) have identified supply and demand side barriers to financial inclusion. The supply constraints to financial inclusion arise from various factors such as poor banking infrastructure, low outreach by existing institutions, lengthy form-filling/account maintaining formalities, security-based lending procedures etc. The constraints for advancing financial inclusion are factors such as poor physical infrastructure, low financial literacy, high cost of services etc. The sole objective of financial inclusion is to extend the scope of activities of the financial system to include within its low income and the unreachable people through the formal financial system (Das Prasun Kumar, 2010). According to Demirg-Kunt et al. (2014) discussing the Global Findex Database 2014, 62% of adults worldwide have an account at a bank or another type of financial institution or with a mobile money provider, up from 51% in 2011. Between 2011 and 2014, 700 million adults became account holders while the number of those without an account dropped by 20% to 2 billion. Account penetration defers enormously between high-income and developing countries in the aggregate: 89% of adults in high-income countries, but only 24% in low-income countries, report that they have an account at a formal financial institution. Reserve bank of India

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attempted to understand the financial needs of poor in long-term and short-term by exploring, how surplus fund is used to meet short-term, long-term and emergency requirements to develop strategies for financial inclusion and designing financial products. Financial engineering is a broad field involved in almost all areas of modern finance, ranging from portfolio management and derivatives, to fund management, value at risk analysis, and credit risk management. It uses a wide range of methodological tools (management science/operations research, probability theory and stochastic calculus, statistics, econometrics, etc.) to analyze financial decision-making problems and to facilitate the construction of innovative solutions and financial products that meet the decision-makers' goals. The review shows that increasing financial inclusion should go beyond the traditional banking sector.

### 1.2 Awareness on Financial Inclusion

Addressing financial exclusion needs holistic approach on the part of the banks to create awareness on financial products and education, advice on money management, debt counseling, saving and affordable credit (Leeladhar, 2006). Shaik (2015) said that the support of financial inclusion can be achieved only through linkages between micro finance institutions and local communities. Banks should give mass publicity about financial services in the rural areas for those who are illiterate and less educated. Growth of life insurance companies and their reach to rural markets is still at a very nascent stage (Rao and Periyasamy, 2014). The study by Balakrishnan (2015) showed from his result that benefits can only be derived from active commitment with financial product and services and not just by access. Here the active commitment is about usage of financial products and services.

### 1.3 Barriers to Financial Inclusion

Sonam Kumari Gupta (2015) study reveals the Pradhan Mantri Jan Dhan Yojana (PMJDY) and latest trends being implemented for financial inclusion by PMJDY. It is found that, of the accounts opened at public sector banks under the Jan Dhan Yojana, only 28% out of 71% of the accounts opened under the scheme are active, with about Rs.9, 000 crores deposited in these. The PMJDY scheme has created an impressive result in the banking sector with regard to eradication of financial untouchability in the country. Mere opening of bank accounts may not fulfill the aim of the scheme, but there should be continuous operation of bank accounts to give the real success of the scheme. (Rajeshwari M. Shettar, 2016). Without a full integration of traditional and contemporary financial innovations any attempt to expand the formal financial system in India is

likely to be of limited utility to the poor ( Garg and Pandey, 2009).

### 1.4 Financial Re-engineering and Financial Inclusion

Financial Re-engineering is redesigning of business processes to achieve dramatic improvements in measures of performance, such as cost, quality, service, and speed (Thomas H. Davenport, 1993). "Financial engineering involves the designing, the development and implementation of innovative financial instruments and processes, and formulation of creative solutions to problems in finance" ( Bansal, 2001). Recent exploration suggests that product plays a very important role in creating a financially inclusive ecosystem. Financial inclusion is still a long road ahead. Innovations in the field of branchless banking and banking business model are making their way towards this goal. Recent exploration suggests that product plays a very important role in creating a financially inclusive ecosystem (Damodaran, 2013). The primary research on life insurance penetration in rural areas of India reveals that that the existing insurance products are not designed for the rural segment (Rao and Periyasamy, 2014). The only way to solve the issue of financial untouchability is advancement of financial inclusion, which may be defined as the process of ensuring access to financial services and timely and adequate credit where needed by weaker sections and low income groups at a reasonable cost. Financial inclusion can be achieved by ensuring access to financial services, affordability of services, and actual utilization of financial services. (Harpreet and Kawal, 2015) Banks needs to redesign their service approach to promote financial inclusion to low income group and consider the policy as business opportunity and corporate social responsibility (Babajide, et al, 2015).

## II. Research Methodology

The objective of the study is to study the emerging challenges for financial inclusion in India. The primary study is done with the help in the rural areas of Gujarat; Also, this study aims to suggest ways to improve financial inclusion in India A detailed questionnaire family background; bank access information; banking Services usage; income; loans; and expectations. The data collection was done in months of year 2015. The data have been collected from 500 respondents from the rural areas of Gujarat. The questionnaires were transacted to vernacular language with the help of local experts help. Table I shows the demographic details of the respondents based upon the age, gender, occupation, educations, income and other variables. The data collected from the recent studies in various parts of India. The research paper discusses the

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reviews of financial inclusion studies in India to identify how it serves the inclusive economic growth in the country. The literature on financial inclusion in India was analyzed in major two aspects like concern for unbanked and the other is underutilizing their bank accounts. Also it attempts to suggest certain tools through financial re-engineering and innovations to advance a level in direction of financial inclusion.

### III. Results & Analysis

The survey shows that out of the only 55 % percent of the surveyed sample is having at least one single or a joint account with one or other bank or any other financial institution. Surprisingly, 45% of the respondents don't possess even a single bank account with any financial institution may be a post of a bank. The cross tabulation of gender with the data on respondents with bank accounts shows that still the out of 225 respondents who do not have accounts, majority (92) of them are the female respondents. Around 35% of them people who are not holding any accounts have majorly no access to banks in near by places. 15% said they don't have adequate documents to open an account. 7 % said they don't have surplus money to put in financial institution or bank; whatever they earn either used or kept with them safe for future emergencies. 27 % of them said that they don't trust financial institutions and 18 % said that they don't need accounts as one or other family member already have an account with one or other financial institutions. The finding indicates that only 30% of the respondents holding accounts normally withdraw money or deposit money once in a month. 80 % of them withdraw cash from bank branch if they need and 20 % of them use ATM Machines to withdraw money. The study also indicates that only 38% of the respondents holding accounts has ATM card which are linked with their bank accounts. And surprisingly, only 8 % percent people use this ATM card for direct purchase. The study reveals that still hardly 16 % of the respondents holding accounts use these bank accounts for sale of agricultural products, crops, produce, livestock etc. The survey exhibits that 50% of the respondent says, they have account but are inactive as there are no transactions since they opened the accounts on others suggestions but don't use for their regular financial needs. 18% of them say that they find it difficult to access the accounts for regular financial needs. 27% of them responded that they are not comfortable dealing with banks. Some others have no reasons. The study finds that 55 % of people have borrowed money in recent past. 48% of them had borrowed money for Education and School Fees of their Children's and grandchildren's. 13 % of them for Medical Purpose, 10 of them had borrowed for their

family members marriages and 24% of them had borrowed money to start a business. 5 % of them for other personal needs. The survey shows 65 % have personally sent or received money to a relative or a friend residing in India in last 1 Year. 76 % of them have sent any money to a relative/ friend thru Angadia. Only 16% had send or received money thru bank / Financial Institution. And rest 8% thru Money Transfer Service.

### Discussions and Suggestions

#### 3.1 Minor - account opening at the time of birth registration

The level of account penetration is still average having access to bank to account. This needs to be increased. Access to bank account should be a birthright of each and every citizen. The authors suggest that all new born babies should have got a minor bank account at the time of birth registration. All the government benefits which include maternity schemes payouts, children scholarships schemes payouts etc should be transferred to this account. This will not only ensure 100% account penetration for future generation but it would also keep the accounts active. An added benefit would be that the future generation would be financially literate as they would be operating such accounts from a young age.

#### 3.2 Easy Access

Accessibility and trust issues are two of the major issues which are stopping people from using banks responding that they don't trust the banks with their hard earned cash. Banks are intimidating to many people especially to the lower income class. They need to shed this image and be more approachable. Government also needs to step in by making the existing banks stronger by reducing the NPA ratio. Willful defaulters having huge exposures should be dealt with an iron hand and made examples of. The density of bank branches need to increased and all areas should get equal weightage.

#### 3.3 Micro Credit and Flexi EMI System

With the Jan Dhan Yojana, huge numbers of accounts have been still there is a long way to go as approximately 45% of populace is still unbanked and not availing any financial services. Even 55% penetration is not enough as just opening an account does not mean financial inclusion. These accounts need to remain active and not dormant. The accounts will only be active if the end user i.e. the customer would get some benefit from maintaining the account and as per our findings almost 50% of the accounts are inactive. While essentially it is a zero balance account so the customer need not worry about maintaining the quarterly balance. However, he does not have any

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motivation to maintain the accounts. We need to motivate the customer by providing him micro credit on the basis of the number of transactions he is doing with the account. For eg: if the customer is having 10 transactions every month we can extend a micro credit of Rs. 5000/- .Unlike the EMI system wherein we need to pay the amount every month the customer should pay up as and when he has enough money to do so. There might be some criticism that the customers would just take loan and not repay back. However, this model was first developed by Mohammad Yunus in the Grameen bank and also it has been followed in the SEWA model. We can definitely in- build some safety measures like micro credit should be only extended where credits are coming from direct benefit transfers and there should be lien to the extent of outstanding amount.

### 3.4 Last Mile Technology Platform

A separate technology platform should be developed where the rural customers are able to get familiarized with the concept of net banking. This platform should consider the unique requirements of the rural customer like buying seeds; groceries etc and use the smart phone as the one stop tool for all the customer requirements. India already has a good smart phone penetration in the rural market. By combining it with the banking and day to day activities financial inclusion would just be a matter of time. There is a huge gap in technology usage for financial services as 0% respondents used mobile money payment platforms or paid utility bills online.

### 3.5 Composite Financial Products

We can club insurance cover with saving accounts or loans account. The insurance cover provided would be based on the number of transactions or amount of loan taken. For e.g. 5 transactions / month you will get a life insurance cover of only 50000. In case if there are 10 transactions then 1 lakh and so on. And if the Insurance is club with the loan accounts, the insurance cover should be given based on recovery of loan and the loan amount issued. There should be special targeted sales schemes for customers for e.g. if you are having 100 transactions a year you will get 20 percent discount on fair shop sales.

### 3.6 Health Care linked SBA

Health care should also be connected with savings account. India still does not have a proper social security scheme for health care in place. Efforts should be made to develop healthcare services which can be utilized by the lower economic strata of the society. Basic health services like annual medical check up, X-ray, etc. should be linking with savings account utilization. Pension schemes should also

be linked with saving accounts. Combination of health and pension services with savings account would help increase the level of financial inclusion.

### 3.7 Financial Literacy subject in schools

It is proposed that financial literacy should be targeted to poor individuals who have distinct financial needs and varied levels of understanding. A compulsory subject to be introduced on financial literacy from 1st standard onwards for school going kids to imbibe the habit of sound financial knowledge from a very young age.

### 3.8 Digital Payouts

Payments such as wages or government transfers should be credited to the savings account rather than 16% percent people are having credit payments and they are all government employees. Digitizing payments such as those for school fees or utility bills allows people who already have an account to benefit more by enabling them to pay in an easier, more affordable and secure way. Direct transfer to accounts represents an enormous opportunity for increasing the use of accounts and making payments more convenient. Payments for the sale of agricultural products offer another opportunity for increasing account ownership among the unbanked.

### 3.9 Digital Remittances

Yet another opportunity for increasing account ownership lies in encouraging those who send or receive domestic remittances only in cash or through over-the-counter transactions to do so through an account. 76% of respondents still use local Angadia/couriers for sending money in India and around 65% have received money through their local Angadia/couriers. There is a huge gap here and the banks should step in should that remittance happen through banks or financial institutions. This would also ensure that the amount of black money become less.

## IV. Conclusion

Despite 67 years as an independent nation, India is still lagging behind in the process of providing financial services to the masses with nearly half the households remaining unbanked, and nearly ninety percent villages not having bank branches. More importantly, people in these unbanked areas do not fully appreciate why they need a bank account at all, or why loans from the formal sector are more useful than the informal sector. The advantages of a financially inclusive model are many-fold. Even though efforts are being made by all stake holders viz regulator, government, financial institutions and others, the efforts are not yielding the kind of result expected. The regulator has to create

a suitable regulatory environment that would keep the interest of all the stakeholders. The concern of banks about profitability is to be addressed by the regulator as the entire process of financial inclusion would be a kind of social work in the first few years. Financial Institutions should allow entrepreneurs to invest in new product innovation in financial innovation. Financial institutions should focus more on products which should be simple, affordable, and should have high utility. Financial institutions should frequently check whether the financial products are actually utilized by customer effectively, if not it should analyze the reasons. Financial institutions should do regular surveys in villages for understanding the financial needs of the people. They should concentrate on the problem faced by clients in availing the microfinance facilities and should re-engineer the current financial instruments to tap the available market efficiently. This research paper reviewed various contexts and literature on financial inclusion in Indian perspective, which can be further extended to practical survey study by selecting a district or a state, comparison studies and national field survey.

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# INVESTIGATING THE RELATIONSHIP BETWEEN PROFESSIONAL ETHICS AND SPIRITUALITY AT WORK WITH SOCIAL RESPONSIBILITY (CASE STUDY: GAS COMPANY OF MAZANDARAN PROVINCE)

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*The present study investigating the relationship between professional ethics and spirituality at work with social responsibility (Case study: Gas Company of Mazandaran province). The populations of this research constitute all employees of Gas Company of Mazandaran province in 2016, to the number of 790 people. Of the target population, the number of 259 people sample taken by using Cochran formula and simple random sampling method. To measure the variables were used of standardized questionnaire of social responsibility of Arab Salehi and colleagues (2013), standard questionnaire spirituality at work of Afsaneh Haghighi (2009), and a standard questionnaire of employees' professional ethics of Zahra Keykha (2013). The reliability of the questionnaire was verified using Cronbach's alpha. The results showed that, there is a significant relationship between professional ethics and spirituality at work and social responsibility in Gas Company of Mazandaran province. Also, there is a relationship between spirituality at work and social responsibility in Gas Company of Mazandaran province. On the other hand, the results showed that spirituality at work plays the role of mediator in the relationship between professional ethics and social responsibility in Gas Company of Mazandaran province.*

*Keywords: Professional Ethics, Spirituality at Work, Social Responsibility.*

In today's world, organizations are considered as an important part of community life. Each of them is relating daily with multiple organizations, as well as organizations broadly, are in contact and competition with other organizations and this is the important role of organizations in community life cycle. According to experts, organizations in today multifaceted society are the main way to achieve the demands and achieve goal that, they could not alone reach them. Fulfilling the demands and organizational goals are influenced by several factors such as: commitment, justice and organizational trust, moral culture and ethical behavior. In the last two decades, moral culture and ethical behavior of employees was the focus of in the organization. Most experts insist on the importance of ethics in the organization and ethics and ethical behavior in the workplace know effectively in achieving to the organizational goals. For example, paying less attention to ethics in the workplace or immoral environment in big companies such as: Arnon, Tycho and WorldCom, they have been the key causes of the scandal and the collapse of these companies. (Yener et al., 2012). Unethical behavior, such as corruption, discrimination and lack of integrity, not only harms to individuals and communities, but also to the organization itself. (Riivari et al., 2012). In all these discussions, is considered importance of ethical standards and the need for ethical standards to guide human behavior. (Grave & Stephen, 2008). In recent years, the

concept of corporate social responsibility has been raised as a sensitive issue and requires attention in the field of management. (Lee, 2008). Social responsibility referred to the activities that do stakeholders on a voluntary basis as a useful member of society. (Rahmanseresht, 2009). In fact, many consumers and clients are expected to act responsibly on behalf of companies, not only towards the stakeholders, but also the general public and the entire community. (Don, 2004). On the other hand, many researchers and scholars seek to identify the reasons for success and failures of the organization have reached to the conclusion that the only reason for organizational success is not factors such as structure, technology and equipment, but also immaterial and spiritual factors have also been

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effectively in the success of organizations. (Hampton, 2007). The term spirituality at work and the workplace is describing the experience of employees, who in their work are passionate and energetic, in their work satisfy them, in their work understand the meaning and purpose and they have feel effective communication with et al. (Ashmos & Duchon, 2000).

Spirituality is contemplation capacity that for everyone was a force of nature and unique (Ahmadi et al., 2011) and to individuals induces a feeling of being with qualities such as innate, capacity to know the heart and source of reinforcement, the subjective experience of the sacred, and the excellence of the individual to the greater the capacity of love and knowledge. (Mazaheri, 2009). Following this concept, spirituality at work is includes health, happiness, wisdom, success and job satisfaction. (Naderi & Rajabipour, 2010). Since, today human concern is always dealing with spirituality (in its many forms), so in terms of structuralism and phenomenology, spirituality is worth a lot to get into the models and human and organizational behavior literature. (Caracas, 2010). The importance of spirituality at work in such a way, that it should be considered as the core of a service organization. (Shojaee et al., 2012). On the other hand, nowadays, alongside issues such as lack of human capital and global competition, as well as professional ethics is considered as one of the future challenges to organizations for excellence. By definition, the purpose of observe moral is observance norms of behavior, which creates a distinction between acceptable behavior and unacceptable. When organizational behavior is morally weak increases the cost of operation for obvious and hidden. These costs can be detected in different areas of the organization, such as low productivity, slow dynamics of organization, lack of transparency and disorganization of corporate communications. (Salehnia & Alahtavakoli, 2010). Professional ethics is one of the new morality branches, which tries to respond to various ethical issues. (Hartog, 2007). The purpose of professional ethics is a set of rules that people must comply with voluntary, and according to their conscience and nature in doing professional work; without have external obligations or in case of violation be subject to legal penalties. (Moberg & Seabright, 2000). In fact, when it comes to talk of ethics, the purpose is the principles governing correct behavior, as well as law or norms that determine the behavior and performance of individuals within a profession. (Ho, 2011).

According to the statement, the attention to social responsibility and related factors affecting it, is very important. According to the impact of employees' professional ethics on the individual and organizational

behaviors is expected to be effective on the social responsibility of employees. Also, the variable role of spirituality should not be neglected in the employees' work on the employees' behavior. Therefore, in this study was to investigate into the relationship between employees' professional ethics and social responsibility, and also the mediator role of spirituality in the employees' work, as well as the relationship between these two variables has been discussed.. So, the main question that is raised in this study, is to find out if there is a significant relationship between professional ethics and spirituality at work with social responsibility in Gas Company of Mazandaran province?

## I. Review of Literature

### Social responsibility

To answer this question, what is social responsibility, Organizations are social systems, which are created to achieve certain goals. They are the elements that are formed as a single body. This body has a plan and purpose. The structure is such that people are able to manage work together to cooperate. It can be said that corporate social responsibility is defined as the continuous commitment of the entity, which will behave ethically and cooperate in the way of economic development. (Arab Salehi et al., 2013).

### Concept of responsibility

Responsibility is often referred to a kind of relationship between people and their environment. In the field of communications, responsibility refers to a response that is nothing more than a projection, for example answers like, "this is the way we work" or "market factors do not leave any choice for us" is not something more than justified. In responsibility individual attitudes toward the actions carried out, also makes part of his answer and the answer may be questioned. (Fisher and Nijhof, 2005). Responsible action requires that responses be provided in accordance with the purposes and motives of actions and activities. Bovens claims that for accountability, there should be an opportunity to act responsibly (Bovens, 1990). Freedom to act responsibly is a general precondition about responsibility. This general precondition can be divided into several aspects, including the desire to act, the ability to anticipate and foresight, to take action and consciously carry out an assessment skills.

### Professional ethics

Professional ethics is part of the morality organization, which helps to improve the position of an organization

in its business scope. It is a branch of knowledge that analysis the professional ethical obligations and ethical issues. Professional ethics knows more about knowing right from wrong in the workplace and then do the right thing and misunderstanding. (Alvani, 2007, p. 47). The meaning of professional ethics is the moral responsibility of the individual in terms of jobs. A physician as an individual has a moral responsibility. But his professional responsibilities is out of a job has been burdened in such a way that, if he accepted another job, he would change his moral responsibilities. Any job raises certain ethical responsibilities. Morality in this sense is "occupational health", which according to the variety of jobs raises certain ethical: medical ethics, teachers ethics, managers ethics, supervisors ethics, lawyers ethics, judges ethics, scholars ethics, journalists ethics, business ethics, etc. (John, 2007).

### Spirituality at work

Spirituality at work refers to needs beyond material rewards employees. Thus, employees are looking for the joy of work, satisfy internal needs, a sense of faith and set high goals and act on the basis of their faith in the great power, and according to Bardeli, find God are at work. Expert's idea of spirituality in the workplace refers to integration in the workplace. Integration connecting the individual life of mental, personal and spiritual with the nature of his works and provides causing psychological needs of employees. In other words, spirituality at work is involves the concept of totality understanding and entanglement in work and is deep values understanding at work. Studies and different theories are found the benefits of spirituality in the workplace to an organization. There is a positive relationship between spirituality with increased employee satisfaction, effort, participation and collaboration, creativity and performance. (Azad Marzabadi et al., 2013). Spirituality gives to employees, the disposal of high level attributes like creativity, integrity, strength, ethics, trust, flexibility, etc., as well as increase productivity, reduces erosion and stability, which in turn is leading to productivity (Reave, 2005). Spiritual values in the workplace are significant, honesty, humility, respect, fairness, listening, appreciation of others, flexible, high understanding, forgiveness, kindness, peace and harmony, creativity, hope and integrity. (Marcus, 2005). Given the wide scope and interpretation of the concept of spirituality in the workplace provided different definitions for it. Spirituality at work is an attempt to create sensitive, super personal relationship, intrapersonal, interpersonal and in working life to personal development to achieve human excellence. (Abedi Jafari and Rastegar, 2007). Another definition, the spirituality considered as contributing to

the inner life, work and social significant. (Ashmos & Duchon, 2000). Also, spirituality expressed a desire to find the ultimate goal in life and life according to that ultimate goal. (Biandish et al., 2012).

### Theories of ethics and social responsibility

Social responsibility refers to cross-organizational ethics that the concept of social responsibility. To clarify better, a brief description is given of the moral theories. Hesmer (1995), offers one of the most complete categories from moral theories:

1. Eternal Law: This view, which is famous to golden rule, as thus summarized that "behave towards others the way, you would like others to behave towards you".
2. Utilitarianism theory: This view is consistent with the definition of ethics, which presented by Jeremy Bentham British thinker, and is focused on results and individual assumptions. Accordingly, the morality of an act is expressed by amount of utility. That is when the benefits of an action for society are greater than its losses, it is a moral act.
3. Deontological: Deontological is against the utilitarianism theory hypothesis. According to this view, which was presented by Immanuel Kant, every act is not dependent on the outcome of it, but depends on meaning the decision maker.
4. Distributive justice: In this theory, proposed by John Rawls, is an action, if it leads to an increase in cooperation between members of the community it can be described as right and just and good (and so moral), and an action that is in the opposite direction of this purpose can be described as inaccurate, unfair and inappropriate (and so immoral). In this view, social collaboration provides social and economic interests and is less important and is made mutes individual effort.
5. Individual freedom: According to this view, which was proposed by Robert Nozick, freedom is the first community need. Therefore, any action that violates personal freedom is immoral, even if established, benefits and more relief for others.

### Research history

Mohajeran and Shohoudi (2014), in his research began the relationship modeling between professional ethics and spirituality at work with social responsibility among nurses in public hospitals in Kermanshah city. The results showed that there was a significant positive relationship between professional ethics and spirituality at work (with a value of

$t=28.2$  and  $P<0.05$ ) and between spirituality at work and social responsibility (with the value of  $t=28.2$  and  $P<0.05$ ). Also, spirituality at work has a role of mediator in the relationship between ethics and social responsibility with the blessings of intermediary role of spirituality, the ethics professionals is an indirect, positive and significant effect on the social responsibility of nurses.

Ghasemzadeh and colleagues (2014), in their study examined the relationship professional ethics with social responsibility and individual accountability: the mediating role of serving culture. The results showed that the professional ethics is a positive and significant relationship with social responsibility, accountability and a culture of service. The results showed that the relationship between professional ethics and individual accountability is mediation by serving culture. But, it did not confirm the mediating role of serving culture in the relationship between professional ethics and social responsibility.

Keramer (2007), in a study entitled, making of corporate social responsibility in international production networks, focused on the question as to how organizations can work in corporate and social responsibility in international production networks. In response to the question, he examined factors such as the diversity and complexity of in the production chain, the power company on the production line and level of ambition.

Copland (2006), in study entitled, corporate and environmental social responsibility in banking, argued that the prevailing accounting principles in many banking organizations are based on social morals.

## II. Research Design & Methods

### Research hypotheses

- 1) There is a relationship between professional ethics and spirituality at work in Gas Company of Mazandaran province.
- 2) There is a relationship between professional ethics and social responsibility in Gas Company of Mazandaran province.
- 3) There is a relationship between spirituality at work and social responsibility in Gas Company of Mazandaran province.
- 4) Spirituality at work plays the role of mediator in the relationship between professional ethics and social responsibility in Gas Company of Mazandaran province.

### Statistical population

The population of this research is all employees of Gas Company of Mazandaran province to the number of 790 people, who are serving in 2016, that have at least secondary school degree and to select the sample is used of the Cochran formula and the sample is obtained, 259 people.

### Methods and tools for data collection

In this study, the main tool for data collection was a questionnaire, which was to contain four demographic questions (age-gender education and work experience), and 8 questions related to aspects of social responsibility, 20 questions related to spirituality work, and 40 questions related to employee professional ethics. According to the research, the questions divided in a five options Likert scale.

### Validity and reliability

In this study, the most important tools for data collection and measure the variables are the questionnaire, the validity of questionnaire is of particular importance (Hafeznia, 2004). In this study, according a standardized questionnaire and frequent use of it by researchers, using the corresponding view point of professors, the validity of the questionnaire were approved. The most common reliability testing is Cronbach's alpha coefficient, which is also used in this study. Thus, 25 questionnaires were distributed among the participants, and data collected, calculated Cronbach's alpha coefficient. Cronbach's alpha reliability coefficient is between zero and one, which zero showing a lack of reliability and a positive one showing full reliability. In this study, by using of SPSS software obtained amount of reliability of the questionnaire, which indicates that the questionnaire is endowed with high reliability, which in this study, the reliability respectively is 0.91, 0.86 and 0.87.

## III. Results & Analysis

For processing and analyzing the results of the questionnaire have been used the statistical analysis software of SPSS16 and AMOS, which is composed of two sections; descriptive statistics and inferential statistics. Tests used include:

Kolmogorov-Smirnov test for uniformity of data distribution.

Structural equation model for the assessment of test variables.

### Research Findings

#### Population statistical descriptions

Of the 258 respondents, 97 people were women, and 161 were men, 23 people were diploma and lower, 54 people were associate degree, 134 people were graduate, and 47 people were MA and higher educated, 18 people were between 20 and 29 years, 122 people were between 30 and 39 years, 74 people were between 40 and 49 years, and 44 people were 50 years and older age, and also between of this people, 60 people were between 5 and 9 years, 71 people were between 10 and 14 years, 102 people were between 15 and 19 years, and 25 patients were over 20 years, has a work experience.

Kolmogorov-Smirnov test: testing normality of variables

In statistics, the use of parametric tests, when data distributed is normal, and the use of non-parametric tests, when data distributed is not normal. So, initially, have to pay the normal distribution of data by using of Kolmogorov-Smirnov test. Normality test results related to the components of the study are shown in table 1.

H0: Data distribution is normal. Sig.  $\geq$  0.05

H1: Data distribution is not normal. Sig.  $\geq$  0.05

Table 1, and the results ( $P > 0.05$  = level of significance), show that the H0 hypotheses is approved. So, with confidence interval of 95%, it can be argued that the social responsibility variable follow a normal distribution, therefore, to answer the research questions can be used of the parameter t- test.

Analytical findings

First hypothesis: There is a relationship between professional ethics and spirituality at work in Gas Company of Mazandaran province.

Table 2 shows the test results. This table is included Pearson correlation coefficient, sig, and data number. According to this table, since the value sig (0.000), is less than 5%, H0 hypotheses is rejected, and there is a correlation between these two variables. Pearson correlation coefficient to 259 data is 0.765.

Therefore, the first hypothesis is accepted, which there is a relationship between professional ethics and spirituality at work in Gas Company of Mazandaran province. Also, this factor is significant at the error level of 1%, which is marked with \*\* symbols. The positive correlation coefficient is a direct relationship and between these two variables.

Second hypothesis: There is a relationship between professional ethics and social responsibility in Gas Company of Mazandaran province.

Table 3 shows the test results. This table is included Pearson

correlation coefficient, sig, and data number. According to this table, since the value sig (0.000), is less than 5%, H0 hypotheses is rejected, and there is a correlation between these two variables. Pearson correlation coefficient to 259 data is 0.657.

Therefore, the second hypothesis is accepted, which there is a relationship between professional ethics and social responsibility in Gas Company of Mazandaran province. Also, this factor is significant at the error level of 1%, which is marked with \*\* symbols. The positive correlation coefficient is a direct relationship and between these two variables.

Third hypothesis: There is a relationship between spirituality at work and social responsibility in Gas Company of Mazandaran province.

Table 4 shows the test results. This table is included Pearson correlation coefficient, sig, and data number. According to this table, since the value sig (0.000), is less than 5%, H0 hypotheses is rejected, and there is a correlation between these two variables. Pearson correlation coefficient to 259 data is 0.727.

Therefore, the third hypothesis is accepted, which there is a relationship between spirituality at work and social responsibility in Gas Company of Mazandaran province. Also, this factor is significant at the error level of 1%, which is marked with \*\* symbols. The positive correlation coefficient is a direct relationship and between these two variables.

Fourth hypothesis: Spirituality at work plays the role of mediator in the relationship between professional ethics and social responsibility in Gas Company of Mazandaran province.

Tested structural equation model diagram to evaluate the fourth research hypothesis for a standard estimate mode and for significantly mode, shown in forms 1 and 2. Table 5 shows the results of the fitted model to evaluate the fourth hypothesis.

According to the results presented in table 5, it is observed that the test statistic related to the relationship between "professional ethics" with "social responsibility" with the mediation of "spirituality at work" is the test statistic ( $|t|=4.036$ ), which are greater than the critical value of 0.05 ( $t_{0.95}=1.96$ ), and thus, can accept significant relationship between these components of the error level of first type 0.05 in this model. The results of goodness of fit are shown in table 6.

Chi-squared test significant level, which puts to the test saturation structural model for this model achieved greater

than first error type of 0.05, and thus, it can be accepted that the error at this level, which the fitted model has affected all significant relationships between variables and them indexes, at the error level of 0.05, the model is considered saturated. Saturation model, have demonstrate of absence of other significant relationships in the model. Also, goodness of fit indices of GFI and AGFI in this model, have estimate greater than contract amount of 0.9, which is indicative of the power of model in explaining the relationship between these variables. Also, indicators of RMR and RMSEA, which is related to the amount of the corresponding model error in the prediction correct amounts observations have small values, which their proximity to zero is indicates a slight error model in explaining communication. Also, the amount of small probability of RMSEA, also (PCLOSE) show that the probability of error of the fitted model from the contract amount of 0.05, is smaller. Consequently, the results of the model are reliable and valid and the model is fitted to the good. Finally, given the obtained results, the spirituality at work plays the role of mediator in the relationship between professional ethics and social responsibility in Gas Company of Mazandaran province. Due to the positive standard coefficient, the variable indirect relationship “professional ethics” with “social responsibility” with the mediation of “spirituality at work” is equal to (0.413), in the corresponding structural model, we can say that the variable of “morals professional”, there is a significant relationship with “social responsibility” with the mediation of “spirituality at work”.

#### IV. Conclusion

In the present study has been to investigate the relationship between professional ethics and spirituality at work with employee social responsibility in Gas Company of Mazandaran Province. The findings of this study showed that spirituality at work plays the role of mediator in the relationship between professional ethics and social responsibility in Gas Company of Mazandaran province. Also, the between the variables of professional ethics, spirituality at work and social responsibility, there is a relationship for two and two together. Also, the findings of this hypothesis, it is consistent with the findings of Mohajeran and Shohoudi (2014). On the other hand, according to the results would suggest that the staff with ethic and better understand spirituality and have more interest to engage in spiritual meetings in the organization. Also professional ethics, despite spirituality at work can have a significant impact on the social responsibility of employees.

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**Table 1: Kolmogorov-Smirnov test for normality of variables**

		Professional Ethics	Spirituality	Social Responsibility
Number		259	259	259
Normal parameter	Mean	3.733	3.62	3.663
	Standard deviation	0.654	0.603	0.572
Kolmogorov-Smirnov statistic		1.102	0.803	0.717
Significantly		0.176	0.539	0.683

**Table 2: Correlation test for the first hypothesis**

		Professional Ethics	Spirituality at work
Professional ethics	Pearson correlation	1	0.765**
	The amount of Sig (two-tailed)		0.000
	Number of data	259	259
Spirituality at work	Pearson correlation	0.765**	1
	The amount of Sig (two-tailed)	0.000	
	Number of data	259	259

**Table 3: Correlation test for the second hypothesis**

		Professional Ethics	Social Responsibility
Professional ethics	Pearson correlation	1	0.657**
	The amount of Sig (two-tailed)		0.000
	Number of data	259	259
Social responsibility	Pearson correlation	0.657**	1
	The amount of Sig (two-tailed)	0.000	
	Number of data	259	259

**Table 4: Correlation test for the third hypothesis of variables**

		Spirituality at work	Social responsibility
Spirituality at work	Pearson correlation	1	0.727**
	The amount of Sig (two-tailed)		0.000
	Number of data	259	259
Social responsibility	Pearson correlation	0.727**	1
	The amount of Sig (two-tailed)	0.000	
	Number of data	259	259

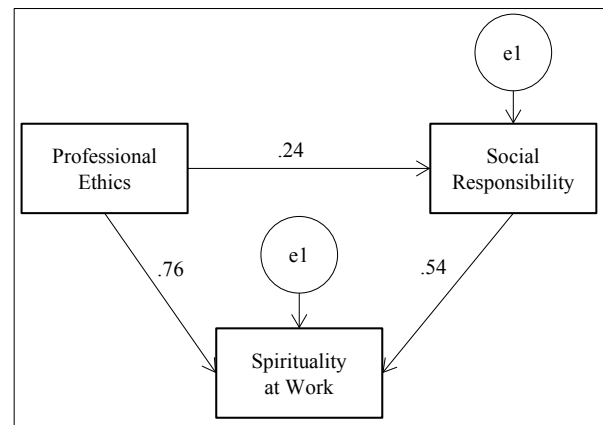
**Table 5: Estimating structural equation modeling coefficients related to the fourth hypothesis**

Effect	Independent	Mediator	Dependent	Coefficient	Standard coefficient	estimation error	Critical value	Significantly
Direct	Professional ethics	→	Social responsibility	0.279	0.244	0.069	4.036	0.000
Indirect	Professional ethics	→ Spirituality* *at work	Social responsibility	0.472	0.413			

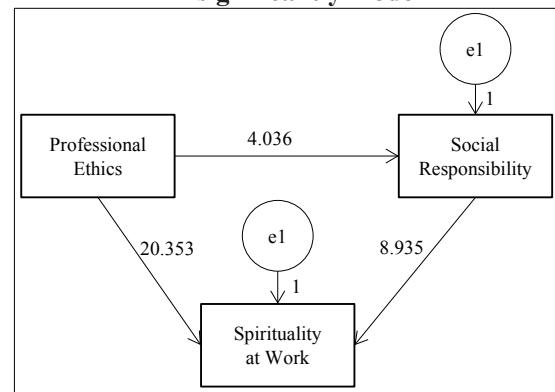
**Table 6: Results of goodness of fit structural equation model for the fourth hypothesis**

PCLOSE	RMSEA	P-Value	$\chi^2$	AGFI	GFI	RMR
0.952	0.017	0.374	64.951	0.948	0.923	0.036

**Figure 1: Tested structural equation model diagram to evaluate the fourth research hypothesis for a standard estimate mode**



**Figure 2: Tested structural equation model diagram to evaluate the fourth research hypothesis for a significantly mode**



# THE IMPACT OF CONFLICT RESOLUTION SKILLS ON THE LEVEL OF MARITAL CONFLICT AND COUPLES MENTAL HEALTH IN CENTERS OF PSYCHOLOGICAL AND COUNSELING SERVICES OF QAEMSHAHR CITY

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*The aim of this study was to the impact of conflict resolution skills to reduce marital conflict and couples mental health in centers of psychology and counseling services of Qaemshahr city. The sample under investigation was 30 pairs of volunteers (30 men and 30 women) from the centers of psychology and life counseling services of Qaemshahr city, which uses simple random method assigned to two experimental and control groups. The research tool was the marital conflicts questionnaire of Barati and Sanaee, and general health questionnaire (GHQ) of Goldberg and Hillier. In this study, the training group people participated in 10 one-hour session on conflict resolution skills training classes. Methodology of this study was an experimental type with designing pretest, posttest and follow-up with control group. The results of the study showed that a significant difference in reducing marital conflict and enhance couples mental health between the experimental and control groups.*

**Keywords:** Marital Conflict, Conflict Resolution Skills, Mental Health

The family as a social system is a group of people, who live together through marriage, reproduction and raising children. This system of social organization, historically, has played a vital role for growth and development and socialization of mankind. Family without a doubt, is the most important organizations, is a ground for the growth and physical, mental and social well-being of people and the cause of their coming to the physical, psychological and social balance. Conflict is the lack of agreement and disagreement between the two men, maladjustment, goals and behavior carried out in opposition to the other, as well as conflicts between individuals, as a result of the antithetic interests and different objectives and different perceptions. Conflict happens naturally in all areas of employment, education, family, marriage, and at the individual and collective level. Family relations are the most compact position to interpersonal conflicts. Romantic relationships prepare the ground for a serious test of skills learned for life. In interpersonal communication, conflict occur when a person finds inconsistent and inconsistency between the goals, needs or desires of his own, and goals, needs and personal desires partner. Disputes and misunderstandings in the family is widespread, and any family is not exempt from this, but sometimes these events will lead to severe conflicts as the institution that its main task was to create a spirit and a healthy personality, it becomes to the factor for affective disorders, behavioral and personality (Barati, 1996).

One of the common problems in the family is marital conflict. Conflict in intimate relationships is a natural thing and marriage is not exempt from this rule, because the frequent and different interaction of couples provides countless areas for conflict (Davies, 2003). Creating discord and conflict between husband and wife is natural. Due to the nature of the act of lovemaking couples sometimes happens that do the difference of opinions or needs are not met, therefore, the couple have feelings of anger, frustration and unhappiness to each other. Marriage is in trouble and conflict for many reasons. Many studies have demonstrated the correlation between marital conflict with depression, eating disorders and especially diseases such as cancer (Marchand & Hock, 2000, Finchman & Beach, 1999). Marital conflict is also causing incompatibility children, attachment of a problem for women, increasing the risk of parent-child conflict and conflict among siblings (Finchman & Beach, 1999). Some of the known issues that can be created marital conflicts are: money, sexual relations, kinship relations, friends, children, sexual infidelity, emotional problems, financial problems, relationship problems (dialogue), work hours and etc. (Sanaee Zaker, 1999). So it seems that the mental health of family members has a close relationship with relationships between members and their adaptability.

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Given the direct impact a couple's relationship quality on the physical and mental health of family members, the conflict resolution skills could be a contributing factor in increasing the strength of the family. Conflict resolution skills deals with to the methods of constructive conflict resolution and familiarity with conflict resolution skills in family life and the concept of conflict and the way it in family life (Miller et al., 2006).

According to the mentioned consequences arising from family conflicts and the importance of health and mental hygiene in the family, the main question is, how much is beneficial the conflict resolution skills program? Do teaching these skills to couples is effective in conflict mitigation and enhancement of mental health?

## I. Review of Literature

### Marital conflict

Couples and families are different than other human groups in many ways such as the duration, intensity and type of operation. In human beings, the family is where we experience the greatest love or hatred in it, or enjoying from the deepest satisfaction, and suffering from the deepest pain. In families, the performance of one member affects on the whole family. Family is a system with balanced dynamics. Stresses and struggles of family life, inevitably, impact on individual members. When the entire system or a portion thereof is faced with imbalance, the system operates in order to restore it to the previous balance (Mac Laver, 1999; quoted by Moradi). The marital conflict is a negative emotional state, which arise due to disability in at least one of the two goals compatible and incompatible. In other words, marital conflict occurs when each of the two sides can not least choose one of two ways uncompromising. (Miller et al., 2006).

### Mental health

Health is quality of life, which it definition is a problem and it is almost impossible the actual measurement. Experts have offered numerous definitions of this concept, but almost all definitions have a common thread and it is responsibility about their and choices healthy lifestyle. Various authors have offered different definitions of mental health. This variation in definitions could be caused by the difference of the various approaches in psychology and different authors believe to a variety of components that exist in relation to mental health and in some cases are achieved by the results of some studies. A state of calm, where the person known their personal abilities can cope with the life normal stresses could have efficiency and developing

employment and is capable of having an important role in society. (World Health Organization 2004).

### Conflict resolution skills

Conflict resolution skills are dealing with the methods of constructive conflict resolution and familiarity with conflict resolution skills in family life and the concept of conflict and attitude to it in family life. These skills are a set of capabilities that provide compatibility and positive and helpful attitude. These abilities enable a person to accept their responsibilities and social role and without hurting yourself and others faced effectively with the demands and expectations and daily problems, especially in interpersonal relationships (Miller et al., 2006).

### Conceptual framework

According to theoretical principles, the conceptual model is shown in Figure 1.

### A variety of theories regarding marital conflict

#### Theories of perceptual difference

One source of conflict is that both sides are at the focus of attention a position intermittently. Conflict begins with perceptual difference and understanding issue, and revealed for behavioral and emotional. In general, there are two views or cognitive theory: motivation- centered model and action- centered model. In the motivation- centered model consider conflicting cause and psychological states, while action- centered model considers as a major focus.

#### Homology theory

Homology theory has created a frame of mind to communicate understanding to conflict behavior. People's perception of equality is determined by evaluating the results. In other words, the person according to what he earned from the relationship and what her husband has received, if one of them feels that the relationship is unfair and unequal is leading to psychological stress and this stress causes of conflict. For example, couples who are both employed, if any in the division of family responsibilities a sense of fairness, spends more free time with others (Young, 1998).

#### Exchange theory

Exchange theory in conflict offers quasi-economic analysis of the interaction between the two people. Interaction seen in the form of fees and rewards, which is engender these two people to each other and attention to aspects of bilateral rewards, punishments and at a cost. (Bernstein

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Quoting Pour Abedi, 2001). Conflict and marital discord from the beginning is conceptualized as a function of the rates of reinforcement and punishment. Perhaps the most appropriate word to boost or bonus is the word consent and to punish or cost is the term dissatisfaction. So the theory of exchange believes that people are trying to maximize the amount of satisfaction (reward), and to minimize the amount of dissatisfaction (cost). Some of the rewards that the couples are exchange include money, goods, love, social status and information. (Furnham, 1983; quoted in Young, 1998).

#### Attribution theory

Attribution theory states that the responses of individuals to a problem depend on its causal implications of the problem. In married life, attributing the cause of the problem to the wife and personal responsibility and to create conflict is rejection a routine procedure, until the person is better feeling about themselves without having to solve the conflict. (Baucom, Epstein, 1990; quoted in Young, 1998). Jacobson and others found that couples desperate, the negative behavior and lack of cooperation with his wife have documents to internal factors and thereby, ensure your maximum negative impact.

#### Research history

- Maryam Sadat Zia al-Hagh (2010), in a study entitled "Effect of emotionally focused couple therapy on marital compatibility" conduct to investigate the impact of emotionally focused couple therapy on increasing marital compatibility. The results showed that emotionally focused couple therapy is to increase the compatibility of their marital disturbed. Results also showed that, although the follow-up phase still scores marital therapy group was higher than the control group, but there was no significant difference between treatment and control groups at posttest until not confirmed pursuit and the continuity of results during the time.

- Oliya (2006) conducted a study aimed to determine the effectiveness of education of marital enrichment on increasing intimacy in couples. Part of the enrichment program was conflict resolution training and problem solving. The results of this study revealed that marital enrichment programs increase intimacy, emotional, intellectual, psychological, social and recreational.

- Halford (2003), in their study examined the effect of communication skills training and found that communication training is effective on reduce the spread and the emergence of marital distress and divorce.

- Lange Barends and Van der Ende (1998), in a program to reduce the suction cache wives to 28 couples in three training sessions gave assignments to increase restraint and also showing adaptive thoughts and emotions. The results showed that wives to be meaningful had progress in controlling their anger.

## II. Research Design & Methods

#### Research hypotheses

-Conflict resolution skills are effective on reduce couples marital conflict.

-Conflict resolution skills are effective on increase couples mental health.

#### Statistical Population

The population of this research is included couples, who due to marital discord from May to late July 2014, referred to psychology and life advice service centers of Qaemshahr city and is a maximum of one year from the date of their marriage. Research sample composed of 30 couples (30 men and 30 women) from the center of psychology and counseling service life of Qaemshahr city that the score of mental health and marital conflicts is more than the rest. Selected samples using randomly assigned to two experimental and control groups.

#### Methods and tools for data collection

To select a sample from the target population, the researcher visiting psychology and life advice service centers of Qaemshahr city and has studied the different cases of couples. Then, to determine the dates of their visit, researcher present in couple of hours and after introducing himself by giving marital conflict questionnaire, they insisted that to complete the questionnaire. Then they collected all the completed questionnaires and calculated their score conflict. Then between the couples, the couples, who had the highest score contradictions and meanwhile were interested in attending in meetings conflict resolution skills, set up an appointment by the researcher with them. In the dates fixed and the presence of the couple formed the first orientation session and on how education is explained to them. Meetings are held on a weekly basis and after random selection of the experimental and control groups to be implemented conflict resolution skills training for the experimental group and if there is no intervention to control group. Experimental programs have been set, according to educational topics carried out in 10 one-hour session for experimental groups. After the training sessions and over a period of two weeks after the last training session run the

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posttest.

Description of the meeting is as follows:

- At their first session, after getting familiar members of the group spoken about the purpose of the program, the importance of the marital relationship, the effects of marital conflict on mental health and physical spouses and children.
- In the second session, be discussion about the concept of conflict and ways to resolve them (competition, abstinence, reconciliation, harmony and cooperation), and asked the participants to review their conflict and think of ways to solve it.
- In the third session, with study dysfunctional interactive patterns (criticism, blame, entrenchment and silence), spoken about efficient interaction patterns and to play a role in the case of a negative and positive interaction.
- At the fourth session, to be explained on empathy, importance and its methods and in this context, is the task to the group.
- In the fifth session, will be discussed to the skills of listening and speaking and then patterning in the case of an act of doing.
- In the sixth session, training and instruction in problem-solving steps and practice in the field.
- Seventh session, non-verbal or physical behavior.
- Eighth session, training and practice, practice of expressing emotions and desires.
- Ninth session, learning and practicing of suppression of anger.
- Tenth session, ways to increase intimacy and sexual bond and respond to participants' questions, always contact during meetings are asked from the participants that what was said in the classes, practice at home and introduce books to them and asked of them that they study this book.

### III. Findings & Analysis

In this study, we use of descriptive statistical and inferential statistics methods to analyze the obtained data. At the descriptive level, by using statistical characteristics, such as frequency, percentage, mean, addressed to describe the population and to test the hypothesis, we used of the t-test and Levene test. For statistical analysis in this study, we used of the SPSS software.

According to table 1, for variable of marital conflict after

training course (among the control group), the amount of sig is equal to zero, which is less than 0.05, so it is rejected the H0 hypotheses, in other words, the mean of marital conflict after training course (among the control group) is severe or relationships are extremely vulnerable.

According to table 1, for the variable of reducing the cooperation after training course (among the control group), the amount of sig is equal to zero, which is less than 0.05, so it is rejected the H0 hypotheses, in other words, the mean of reducing the cooperation after training course (among the control group) is high.

According to table 1, for the variable of reducing sexual relationship after training course (among the control group), the amount of sig is equal to zero, which is less than 0.05, so it is rejected the H0 hypotheses, in other words, the mean of reducing sexual relationship after training course (among the control group) is high.

According to table 1, for the variable of increasing emotional reactions after training course (among the control group), the amount of sig is equal to zero, which is less than 0.05, so it is rejected the H0 hypotheses, in other words, the mean of increasing emotional reactions after training course (among the control group) is high.

According to table 1, for the variable of increasing recruitment of child support after training course (among the control group), the amount of sig is equal to 0.695, which is more than 0.05, so it is not rejected the H0 hypotheses, in other words, the mean of increasing recruitment of child support after training course (among the control group) is moderate.

According to table 1, for the variable of increase personal relationship with your relatives after training course (among the control group), the amount of sig is equal to zero, which is less than 0.05, so it is rejected the H0 hypotheses, in other words, the mean of increase personal relationship with your relatives after training course (among the control group) is high.

According to table 1, for the variable of reducing the family relationship with the partner's relatives and friends after training course (among the control group), the amount of sig is equal to 0.539, which is more than 0.05, so it is not rejected the H0 hypotheses, in other words, the mean of reducing the family relationship with the partner's relatives and friends after training course (among the control group) is moderate.

According to table 1, for the variable of separate the finances of each other after training course (among the

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control group), the amount of sig is equal to 0.014, which is less than 0.05, so it is rejected the H0 hypotheses, in other words, the mean of separate the finances of each other after training course (among the control group) is high.

According to table 1, for the variable of mental health after training course (among the control group), the amount of sig is equal to zero, which is less than 0.05, so it is rejected the H0 hypotheses, in other words, the mean of mental health after training course (among the control group) is high which is indicative of the lack of adequate mental health.

According to table 1, for the variable of symptoms of physical after training course (among the control group), the amount of sig is equal to zero, which is less than 0.05, so it is rejected the H0 hypotheses, in other words, the mean of symptoms of physical after training course (among the control group) is high.

According to table 1, for the variable of symptoms of anxiety and insomnia after training course (among the control group), the amount of sig is equal to zero, which is less than 0.05, so it is rejected the H0 hypotheses, in other words, the mean of symptoms of anxiety and insomnia after training course (among the control group) is high.

According to table 1, for the variable of symptoms of impairment in social functioning after training course (among the control group), the amount of sig is equal to zero, which is less than 0.05, so it is rejected the H0 hypotheses, in other words, the mean of symptoms of impairment in social functioning after training course (among the control group) is high.

According to table 1, for the variable of symptoms of depression after training course (among the control group), the amount of sig is equal to zero, which is less than 0.05, so it is rejected the H0 hypotheses, in other words, the mean of symptoms of depression after training course (among the control group) is high.

Table 2 shows the number, mean, and standard deviation of marital conflict and mental health and their dimensions, in the control and the experimental group after the training.

According to table 3, the amount of sig for the variables of marital conflict, reducing the cooperation, increasing emotional reactions and reducing family relationship with the partner's relatives and friends in Levene test is less than 0.05, which indicates that for this variables, the variances are not equal and for other variables, the Levene test is more than 0.05, and is not rejected the null hypothesis. This means that the variances are equal. Thus, according

to the amount of T-statistic and sig, which is less than 0.05, the null hypothesis is rejected for all the variables, ie, there are differences between the two groups of control and experimental after the training.

#### IV. Conclusion

The results are indicate that the amount of independent T, obtained from the difference between the mean scores of experimental and control groups at the level of 95%, and with 29 degrees of freedom and statistically is significant, and this means that the null hypothesis is rejected and the research hypothesis is accepted. This means that with 95% certainty, we can say that the teaching conflict resolution skills in couples in the experimental group could make a significant difference between the scores of marital conflict of this group of couples and the control group. As well as, the amount of independent T, obtained from the difference between the mean scores of experimental and control groups at the level of 95%, and with 29 degrees of freedom and statistically is significant, and this means that the null hypothesis is rejected and the research hypothesis is accepted. This means that with 95% certainty, we can say that the teaching conflict resolution skills in couples in the experimental group could make a significant difference between the scores of mental health of this group of couples and the control group.

The results show that the conflict resolution skills program has been able generally causes reducing conflicts between divorced spouses and increasing their mental health. This finding are consistent with findings of Bernstein and colleagues (1989), based on the combined effect of problem-solving program with communication training in reducing marital distress. The results of this study are consistent with findings of Jacobson (2004), Yalsin (2004), Schilling et al (2001), Halford et al (2001), Butler and Vampler (1999) and Miller et al (1991), which believe that the conflict resolution skills program is effective on attitudinal and behavioral couples aspects and mental health. This finding is also consistent with the ideas of Jarvis and colleagues (2005), who believe that communication skills training teach the person how to be constructive to pay to solve problems. It can therefore be said that a sure way to reduce conflicts between couples are divorced and increasing their mental health is conflict resolution skills. Also, the clinical experiences researcher is that the skills of conflict resolution has a significant impact in reducing marital conflict and increasing mental health. According to this study, we can conclude the conflict resolution skills training as one of the psychological interventions tests

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added to other counseling interventions.

Finally, according to the results offered the following suggestions:

- It is suggested that this research, carried out in other communities and compare the results with each other.
- It is suggested that this research, carried out with a broader age range to study the effect of other variables on psychological well-being.
- According to the research that has been done and the positive effects of conflict resolution skills on the fate of the couple and has proved its success, it is suggested that by putting workshops for couples as a families education, be taught to them to increasing the increase psychological well-being and growth in the couples.

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**Table 1: T-test for variables after training**

Dimension	Population Mean	Number	T-test			
			Mean	t	df	Sig
Marital conflicts	126	30	139.4333	4.895	29	0.000
Reducing the cooperation	15	30	17.4667	4.218	29	0.000
Reducing the sexual relationship	15	30	17.6667	5.553	29	0.000
Increasing emotional reactions	24	30	27.0667	4.593	29	0.000
Increasing recruitment of child support	15	30	14.7333	-0.396	29	0.695
Increasing personal relationship with your relatives	18	30	21.4000	7.999	29	0.000
Reducing family relationship with the partner's relatives and friends	18	30	18.3333	0.621	29	0.539
Finances separate from each other	21	30	22.7667	2.614	29	0.014
Mental health	42	30	60.8000	21.068	29	0.000
Symptoms of physical	10.5	30	14.7333	14.729	29	0.000
Symptoms of anxiety and insomnia	10.5	30	13.6667	7.609	29	0.000
Symptoms of social dysfunction	10.5	30	16.6333	18.004	29	0.000
Symptoms of depression	10.5	30	17.5665	22.300	29	0.000

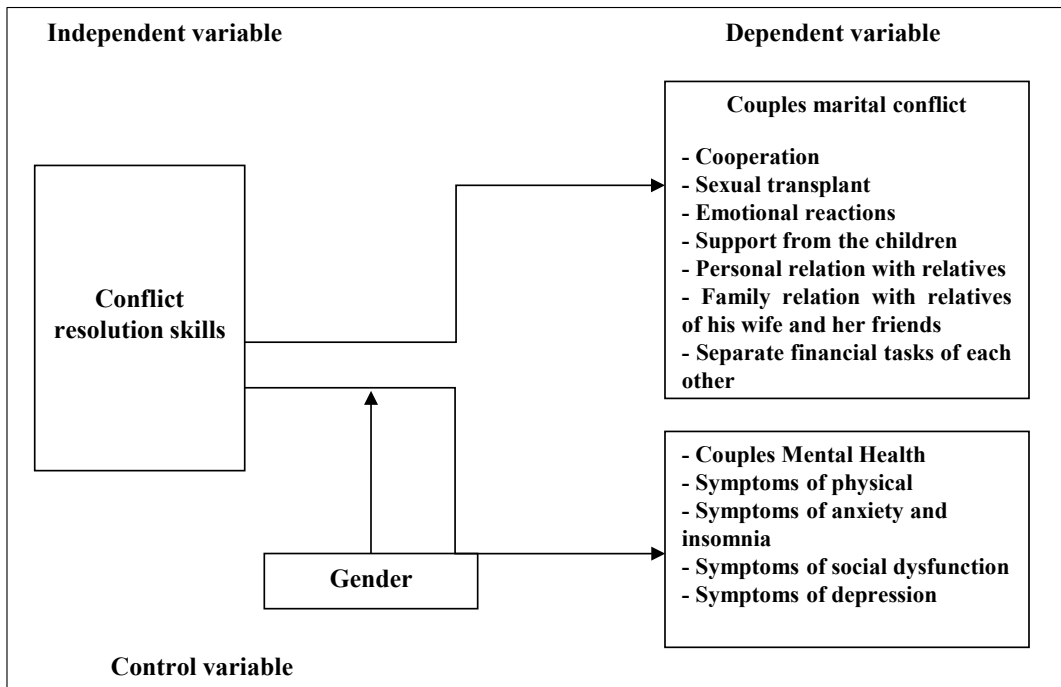
**Table2: Descriptive statistics**

Group	Num ber	Mean	Standard Deviation
Marital conflicts	Control	30	139.4333
	Experimental	30	95.1667
Reducing the cooperation	Control	30	17.4667
	Experimental	30	10.8667
Reducing the sexual relationship	Control	30	17.6667
	Experimental	30	11.4000
Increasing emotional reactions	Control	30	27.0667
	Experimental	30	18.7333
Increasing recruitment of child support	Control	30	14.7333
	Experimental	30	11.0000
Increasing personal relationship with your relatives	Control	30	21.4000
	Experimental	30	13.2000
Reducing family relationship with the partner's relatives and friends	Control	30	18.3333
	Experimental	30	14.2333
Finances separate from each other	Control	30	22.7667
	Experimental	30	15.7337
Mental health	Control	30	60.8000
	Experimental	30	38.3000
Symptoms of physical	Control	30	14.7333
	Experimental	30	10.3333
Symptoms of anxiety and insomnia	Control	30	13.6667
	Experimental	30	10.3000
Symptoms of social dysfunction	Control	30	16.6333
	Experimental	30	9.7333
Symptoms of depression	Control	30	17.5667
	Experimental	30	9.4667

**Table 3: Analysis of Levene test and t-test**

		Levene test		T-test	
		F-statistic	sig	T-statistic	sig
Marital conflicts	Variances are equal	8.723	0.005	13.948	0.000
	Variances are not equal			13.948	0.000
Reducing the cooperation	Variances are equal	9.226	0.004	10.081	0.000
	Variances are not equal			10.081	0.000
Reducing the sexual relationship	Variances are equal	0.067	0.797	9.459	0.000
	Variances are not equal			9.459	0.000
Increasing emotional reactions	Variances are equal	9.878	0.003	11.222	0.000
	Variances are not equal			11.222	0.000
Increasing recruitment of child support	Variances are equal	1.754	0.191	4.287	0.000
	Variances are not equal			4.287	0.000
Increasing personal relationship with your relatives	Variances are equal	0.349	0.557	14.302	0.000
	Variances are not equal			14.302	0.000
Reducing family relationship with the partner's relatives and friends	Variances are equal	5.694	0.020	6.356	0.000
	Variances are not equal			6.356	0.000
Finances separate from each other	Variances are equal	3.492	0.067	8.337	0.000
	Variances are not equal			8.337	0.000
Mental health	Variances are equal	1.674	0.201	20.184	0.000
	Variances are not equal			20.184	0.000
Symptoms of physical	Variances are equal	0.742	0.393	9.938	0.000
	Variances are not equal			9.938	0.000
Symptoms of anxiety and insomnia	Variances are equal	2.707	0.105	6.506	0.000
	Variances are not equal			6.506	0.000
Symptoms of social dysfunction	Variances are equal	0.028	0.868	12.699	0.000
	Variances are not equal			12.699	0.000
Symptoms of depression	Variances are equal	1.545	0.219	19.453	0.000
	Variances are not equal			19.453	0.000

**Figure 1: Conceptual Framework**



# DEVELOPMENT OF EMOTIONAL EFFECTS ON ENTREPRENEURIAL PERSONALITY AND INNOVATION

Fazel Larijani★ Nahid Saravi-Moghadam★★

*In today's competitive world, entrepreneurial personality and innovation are considered as key factors to success and survival for organizations. So far, the literature has recognized various items that affect entrepreneurial personality and innovation in organizations. The study analyzes how emotional intelligence dimensions predict entrepreneurial personality and innovation. In terms of objective, this study is considered as an empirical one, and the research methodology is descriptive type. The population includes 265 managers and professional experts working in Kalleh Company from Iran. Structural Equation Modeling (SEM) was used for data analysis. The Results of study showed each of the emotional intelligence dimensions revealed that except use of Emotion; all of them enhanced innovation and entrepreneurial personality in Kalleh Company. The current research also provides more suggestion for future studies that could consider consequences of entrepreneurial personality and Innovation in their career.*

*Keywords: Emotional, Emotional intelligence, Entrepreneurial Personality, Innovation.*

The two most popular models of emotional intelligence (EI) define the construct as either a) ability or aptitude or, b) a combination of dispositions and self-perceptions relating to emotions (P. Martin-Raugh, J. Kell, & J. Motowidlo, 2016). Many studies in the field of Emotional intelligence (EI) have focused on the creation of instruments for assessing individual EI (Aritzeta et al., 2016). Petrides, Pita, & Kokkinaki (2007, p. 273) define trait EI as a lower order personality trait that encompasses “emotion-related dispositions and self-perceptions measured via self-report.” Conversely, ability models of EI posit that because EI is a particular type of intellectual ability, the construct should overlap with cognitive ability to some extent (Mayer, Salovey, Caruso, & Sitarenios, 2001). Many authors emphasize that the individual psychological dispositions of the entrepreneur are an essential factor in determining whether a commercial start-up achieves success (Espiritu-Olmos & Sastre-Castillo, 2015). Therefore, it has become of the utmost importance for organizations to be both adaptive and innovative. More specifically, Brannback (1999) notes that if companies are to achieve growth in the future, innovativeness is the only line of action.

The aim of this paper is to investigate the effect of emotional intelligence dimensions (self-emotions appraisal, others-emotions appraisal, use of Emotion, and regulation of Emotion) on entrepreneurial personality and Innovation in Kalleh Company from Iran. This study has a dual value: first, it contributes to the research knowledge of organizational behavior in the Industrial/Organizational Psychology field; and second, it identifies the relationship between emotional intelligence dimensions on entrepreneurial personality and Innovation. Identifying the relationship between these

variables values contributes to the field knowledge, solves the research problem of this study and fills this gap.

The research questions are formulated as follows:

1. Has emotional intelligence dimensions impact on the entrepreneurial personality of managers in Kalleh Company?
2. Has emotional intelligence dimensions impact on the innovation of managers in Kalleh Company?

## I. Review of Literature

Theoretical perspectives

In this section, we propose, four dimensions of emotional intelligence consist of self-emotions appraisal, others-emotions appraisal, use of Emotion, and regulation of Emotion as independent variables, and two major factors as dependent variables, including innovation and entrepreneurial personality from Iran in Kalleh Company. We propose a theoretical model of emotional intelligence dimensions on innovation and entrepreneurial personality.

Literature of the Emotional intelligence

Khafef, Salovey, Caruso, & Sitarenios (2003), defined emotional intelligence as the intelligence to employ emotion and feeling toward guiding behavior, thoughts, and relationship with others, colleagues, supervisors, and

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clients and also to spend time to improve the outcomes. According to the cascading model of emotional intelligence (Joseph & Newman, 2010; P. Martin-Raugh et al., 2016), emotion understanding is causally related to emotion management, and is considered a more distal predictor of job performance than emotion management, which is thought to be more proximally related to performance. Many researchers have defined emotional intelligence, but distinct differences exist among research groups in what is considered a facet of emotional intelligence. Some believe EI includes motivation, delayed gratification and mood regulation (Crowne, 2007), while others refer to it as an ability to perceive, express, understand, use and manage emotions accurately and adaptively (Salovey & Pizarro, 2003). Seminal research on emotional intelligence defined it as an ability which focuses on the perception and expression of emotion accurately and adaptively; along with the ability to understand emotional knowledge, use feelings to facilitate thought, and to regulate emotions, in not only one self, but also others (Crowne, 2007). Trait emotional intelligence is a relatively stable characteristic (Hui-Hua & S. Schutte, 2015). Trait emotional intelligence reflects how individuals describe their own emotional capacities and is a composite of personality variables such as trait empathy, self-esteem, and adaptability (Balakrishnan & H. Saklofske, 2015). Emotional intelligence is defined as the underlying ability to understand and manage emotions (Afshar & Rahimi, 2016). In behavioral science, emotion is an essential construct for comprehending consumer preference in the consumption of products or services. The Affect Infusion Model (AIM) provides a suitable theoretical aspect to understand how a person's information process and judgment ability can be predisposed by his affective state (Dai, Luo, Liao, & Cao, 2015). Positive and negative emotions operate differently. By introducing the concept of "emotional intelligence" psychologists have tried to make it clear that emotion and intelligent are not two ends of one spectrum (Hakkak Nazarpouri, Mousavi, & Ghodsi, 2015). Emotional intelligence consists of adaptive emotional functioning, Perceiving, understanding, and managing emotions effectively in the self and others are core competencies comprising emotional intelligence (García-Sancho, Salguero, & Fernández-Berrocal, 2016).

#### Literature of the Innovation

Innovation is the process of turning ideas and knowledge into new value through creative thinking. Innovativeness is an important element of entrepreneurship. Innovativeness is the ability and tendency of entrepreneurial leaders to think creatively and recognize opportunities to produce novel

and practical ideas, create new markets, and introduce new products and services (Ozaralli & K. Rivenburgh, 2016). Innovation is not only part of business activity but also crucial in the capability to discover, evaluate, and exploit market opportunities available to entrepreneurs (Huang & Mas-Tur, 2015). According to innovation diffusion theory innovative people react differently in their adoption behavior towards a creative idea or new practice (Seiders, Voss, Godfrey, & Grewal 2007). Due to the dynamic nature of most markets, it is nearly impossible to find an industry that is not engaged in continuous or periodic innovation (Beinert, 2006). Innovative individuals are more likely to act jointly to meet the expectations of the service provider instead of worrying about its vulnerabilities (Dai et al., 2015). The ability to innovate in technology helps to create new products, improve existing products, develop knowledge, and achieve business objectives more efficiently. In the long term, innovation reduces costs, risks, and time (Mas-Tur & Soriano, 2014). Fierce competition in the global market has made innovation and differentiation a necessity for every company (Tajeddini & Trueman, 2008a). Tacit knowledge from the constant and continual interaction of family and firm (Koenig, Kammerlander, & Enders, 2013) makes firms "better able to extend capabilities and produce more novel innovations" (Carnes & Ireland, 2013). In turn, relying on strategic behavioral controls is positively related to the use of long-term strategic criteria in the course of deciding how to allocate a family firm's resources, with the use of long-term criteria leading to flexible decisions supporting innovation (Hatak, Kautonen, Fink, & Kansikas, 2015).

#### Literature of the Entrepreneurial Personality

According to Mair (2002, p.1), entrepreneurial behavior within existing organizations is "...a set of activities and practices by which individuals at multiple levels, autonomously generate and use innovative resource combinations to identify and pursue opportunities..." Entrepreneurial behavior occurs at the nexus of the enterprising individual and the entrepreneurial opportunity (Douglas & Fitzsimmons, 2013). Because both the individuals and the opportunities are heterogeneous (Samuelsson & Davidsson, 2009), individuals can recognize entrepreneurial opportunities, but they do not necessarily recognize them as opportunities that they themselves can or should pursue. McMullen & Shepherd (2006) coined the term 'potential opportunities for anyone' versus 'potential opportunities for a specific individual', which highlight the distinction between third and first-person entrepreneurial opportunities (Mitchell & Shepherd,

2010), respectively. This distinction in turn points to the importance of examining images of entrepreneurship in conjunction with images of self (Mitchell & Shepherd, 2010; Kautonen, Van Gelderen, & Fink, 2015). There are two main research streams on the factors that stimulate or constrain corporate entrepreneurship and entrepreneurial behavior (Kuratko, Ireland, & Hornsby, 2004). The first stream places the organization at the center and the second stream focuses on the individual (Shane, Locke, & Collins, 2003). The literature reveals that the majority of corporate entrepreneurship research has primarily examined the effect of firm-level contextual factors on entrepreneurial behavior and neglects the interaction between individuals (Antoncic & Hisrich, 2002). Exceptional business success is based on the influence of growth intentions and behaviors (Doern, 2011). An entrepreneur is an agent of change: the seminal actor who conceives and implements a new business venture, impelling a new economic entity from ideation to functional reality. The entrepreneur assumes the risks of forming a business or enterprise, organizing and managing every facet of its emergence (Carayannis & Stewart, 2013). Entrepreneurs are sometimes indeed considered as the selfish actor in the economy. At the same time they also need to have the ability to create and maintain a social network – an ability which seems to be in certain contradiction to selfishness. Nevertheless, it is widely believed that creating a social network is a crucial characteristic for becoming a successful entrepreneur (Caliendo & Kritikos, 2012).

#### The Effect of Emotional Intelligence on Innovation and Entrepreneurial Personality

As was described in this research has been prepared and implemented in order to investigate the impact of emotional intelligence on innovation and entrepreneurial personality.

#### The Effect of Emotional Intelligence on Innovation

White (2008) suggested that Emotional intelligence has significant effects on Innovation. Salajegheh Nikpour, & Nobari (2011) believes that Emotional intelligence and its dimensions (i.e. Impulses, self-actualization, interpersonal relations and empathy) affects employees' innovative behavior to a large extent and could even predict their innovative behavior; therefore, innovative behavior seems to be an essential factor for all the organizational levels in order for fostering innovation. Yunesifar, Mohaghar, Yunesifar, & Ghahvehchi (2013) believes that Emotional intelligence and its dimensions (i.e. Self-awareness, self-management, social awareness and relationship management) affects employees' innovative

behavior in hospital. Also, Raesi, Nasiripour, & Ghafarian (2014) was among others who pointed out that there is a positive relationship between Emotional intelligence and its dimensions (i.e. self-management, relationship management and communications) on Innovation.

In this study, in order to assess and examine the emotional intelligence has been used the Crowne's model four dimensions (Self-Emotions Appraisal (SEA), Others-Emotions Appraisal (OEA), Use of Emotion (UOE) and Regulation of Emotion (ROE)). Emotional intelligence and Innovation relationship is summarized in the following hypothesis:

HA. Emotional intelligence has a significant positive impact on Innovation in Kalleh Company.

Considering the decomposition of Emotional intelligence into its component units; HA can be divided into the following:

H1. Self-Emotions Appraisal has a significant positive impact on Innovation in Kalleh Company.

H2. Others-Emotions Appraisal has a significant positive impact on Innovation in Kalleh Company.

H3. Use of Emotion has a significant positive impact on Innovation in Kalleh Company.

H4. Regulation of Emotion has a significant positive impact on Innovation in Kalleh Company.

#### The Effect of Emotional intelligence on Entrepreneurial Personality

Sternberg (2004), assert that successful intelligence, not just a subset of its components (analytical, creative, and practical abilities), is needed for entrepreneurial success. Zhang & Bruning (2011) detected that entrepreneurs' personal characteristics, such as need for achievement, need for cognition, and internal locus of control, have positive influences on firm performance. Furthermore, it is demonstrated that their strategic orientations mediated these influences. The data indicate that entrepreneurs with higher levels of internal locus of control are more likely to adopt an entrepreneurial orientation than a market orientation. Chizri Abasi, & Rahmanian (2013) declared that Emotional intelligence and its dimensions (i.e. Self-Emotions Appraisal, Others-Emotions Appraisal, Use of Emotion and Regulation of Emotion) affects employees' entrepreneurial behavior. Moshabbaki, Alitabarbaee, & Shayganfard (2012) and Marashian, Naderi, Heydari, Enayati, & Asgari (2013) were among others who pointed

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out that there is a positive relationship between Emotional intelligence and entrepreneurial. Emotional intelligence and entrepreneurial personality relationship is summarized in the following hypothesis:

HB. Emotional intelligence has a significant positive impact on entrepreneurial personality in Kalleh Company. Considering the decomposition of Emotional intelligence into its component units; HB can be divided into the following:

H5. Self-Emotions Appraisal has a significant positive impact on entrepreneurial personality in Kalleh Company.

H6. Others-Emotions Appraisal has a significant positive impact on entrepreneurial personality in Kalleh Company.

H7. Use of Emotion has a significant positive impact on entrepreneurial personality in Kalleh Company.

H8. Regulation of Emotion has a significant positive impact on entrepreneurial personality in Kalleh Company.

For to identify and examine the entrepreneurial personality and innovation respectively Littunen's model with seven components and model of Dorabjee, Lumley, & Cratwright, (1998), with nine components is used.

The conceptual model of the present research (see Figure 1) based on six main structures each play a different role, has been traced.

## II. Research Design & Methods

### Setting and sample

Since this study seeks to investigate the causal relationships between emotional intelligence and entrepreneurial personality and Innovation in Kalleh Company from Iran. The purpose of this study is considered as an empirical one in terms of objective, and its research methodology is descriptive-correlative type. More specifically, structural equation modeling (SEM) was used for data analysis. The population includes 265 managers and professional experts working in Kalleh Company from Iran. Independent and dependent variables in this study respectively include Self-Emotions Appraisal, Others-Emotions Appraisal, Use of Emotion and Regulation of Emotion, as independent variables and innovation, entrepreneurial personality as dependent variables in Kalleh Company.

### Measurement

The study instrument includes questions about the six proposed dimensions from Self-Emotions Appraisal,

Others-Emotions Appraisal, Use of Emotion, Regulation of Emotion, innovation and entrepreneurial personality in Kalleh Company in Iran. Responses to the items; emotional intelligence dimensions, innovation and entrepreneurial personality were elicited on five-point scales ranging from "5 strongly agree" to "1 strongly disagree".

To operationalize the dimensions of Emotional intelligence include four dimensions (Self-Emotions Appraisal (SEA), Others-Emotions Appraisal (OEA), Use of Emotion (UOE) and Regulation of Emotion (ROE)), suggestions from Crowne (2007) study with sixteen items were employed. The measurement of the innovation include nine dimensions (Challenge, Freedom, Trust, Idea time, Play/humor, Conflicts, Idea support, Debates and Risk taking) with forty nine items developed by (Dorabjee et al., 1998) were employed. Finally to measure the entrepreneurial personality include seven dimensions (Work ethic, Pursuit of excellence, Mastery, Dominance, Chance, Internal and Powerful others) with twenty eight items, developed by (Littunen, 2000) were employed. The final scale consists of 93 questions to capture the three dimensions.

The survey instrument was originally developed in English and back-translated to be employed in Iranian culture. Its wording and the face validity of the questions were examined by ten management experts. To evaluate the validity and internal consistency of the measurement scales: Cronbach's alpha was applied for inter-term consistency of independent and dependent variables and confirmatory factor analysis was performed to test the one-dimensional qualities of the scales and construct validity of each of them. The validity coefficients of independent, dependent variables resulted in Table 1. In these findings each coefficient is shown to exceed the cut-off value of 0.70 as recommended by Nunnally (1978). Table 2 presents the measurement model results, including information about reliability and average variance extracted for principal construct. Values greater than 0.50 for the average amount of variance (AVE) and more than 0.70 for the composite reliability are used (Azar, Gholamzadeh, & Ghanavati, 2012; Bontis, Crossan, & Hulland, 2002; Fornell & Larcker, 1981). All constructs in the revised instrument showed high reliabilities (composite reliability > 0.70) and the average variance extracted was more than 0.50 in all cases. Please see Tables 1 & 2.

## III. Results and Discussions

### Psychometric properties of the measures

The Structural Equation Modeling (SEM) approach by

LISREL methodology with LISREL 8/54 software were used. Structural equation modeling is a very general, chiefly linear, chiefly cross-sectional statistical modeling technique. Factor analysis, path analysis and regression all represent special cases of SEM (Hair, Anderson, Yatham, & Black, 1999).

Items having standardized loadings below 0.50 and/or items having no significant inter item correlations were deleted. According to the initial results of the confirmatory factor analysis items from emotional intelligence, Use of Emotion (UOE) dimension ; q9: "I always set goals for myself and then try my best to achieve them", q10: "I always tell myself I am competent person", q11: "I am a self-motivating person"; q12: "I would always encourage myself to try my best"; items from innovation; q10: "People here make decisions on their own to a fairly large extent", q11: "Most people here priorities their own work to a rather large extent", q13: "People take notice of what I say", q14: "I think I am usually a leader in my group", q15: "I think I would enjoy having authority over other people", q16: "If given the chance, I would make a good leader of people", q19: "Time is available to explore new ideas here", q27: "Good-natured joking and teasing occurs frequently here", q28: "The atmosphere here is easy-going and light-hearted", q29: "There is a great deal of personal tension here", q35: "People here receive support and encouragement when presenting new ideas", q44: "People here often discuss different points of view", q45: "A diversity of perspectives is allowed here", q49: "Uncertainty and ambiguity are tolerated here"; items from Entrepreneurial Personality; q6: "Part of the satisfaction in doing something comes from seeing how good the finished product looks", q20: "It's not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune", q27: "In order to have my plans work, I make sure that they fit in with the desires of people who have power over me", were eliminated.

The final results (see table 3) of the confirmatory factor analysis demonstrated a reasonable fit of the five-factor model to the data on the basis of a number of fit statistics (Chi-Square ( $\chi^2$ )= 769.97, df= 283,  $\chi^2/df$ = 2.72, P-value= 0.16029, RMSEA= 0.047, NNFI= 0.968, CFI= 0.901, GFI= 0.924, IFI= 0.97, AGFI= 0.907). Chi-square ratio to the degree of freedom should be less than 4, the amount of which is calculated is 2.72.

As indicated in Table 1, demonstrates that all reliability coefficients were deemed acceptable, since they exceeded the bench mark of 0.70 as recommended by Nunnally (1978). The results show that six dimensions are loaded

significantly except for Use of Emotion in Kalleh Company from Iran. Therefore five dimensions are loaded significantly in Kalleh Company. Therefore, assessment tool has the proper validity and reliability and the model can be stored based on the proposed amendments with the LISREL.

#### Correlation analysis results

Composite scores for each study variable were calculated by averaging scores across items representing that construct. Table 4 demonstrates the correlation coefficients among study variables.

The correlation coefficients ranged from 0.54 to 0.85. None of the correlation coefficients were equal to and/or above 0.90, providing empirical support for discriminant validity. Means and standard deviations of study variables are also presented in the following table.

#### Test of hypotheses

The significance coefficient in LISREL output is equal or more than 1.96, which shows that the hypotheses are significant. Research hypotheses would be supported if the score becomes above 1.96. The path analysis shown in (Figure 2; Table 5) indicates that the research hypothesis is confirmed or not. The path analysis shown in Figure 2 indicates that two of the three components; self-emotions appraisal, others-emotions appraisal and regulation of emotion in kalleh Company and improve the conceptualization of emotional intelligence; others-emotions appraisal (estimates = 0.21, t = 2.39, p> 0.01), and regulation of emotion (estimates = 0.33, t = 4.10, p> 0.01) have significant and positive impact on innovation that provide support for H2 and H4. In addition, self-emotions appraisal (estimates = 0.28, t = 3.29, p> 0.01), others-emotions appraisal (estimates = 0.30, t = 3.56, p> 0.01), and regulation of emotion (estimates = 0.19, t = 2.06, p> 0.01) have significant and positive impact on Entrepreneurial Personality that provide support for H5, H6 and H8. So the hypotheses (H1, H3, and H7), were rejected.

## IV. Conclusion

The present study extends the concept of emotional intelligence dimensions (Self-Emotions Appraisal, Others-Emotions Appraisal, Use of Emotion and Regulation of Emotion), entrepreneurial personality and innovation in Kalleh Company. The study analyzes how emotional intelligence dimensions predict entrepreneurial personality and Innovation. Our scale comprises 93

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variables representing the six dimensions of Self-Emotions Appraisal, Others-Emotions Appraisal, Use of Emotion, Regulation of Emotion, entrepreneurial personality and Innovation.

Important practical and theoretical implications that benefit emotional intelligence dimensions entrepreneurial personality and Innovation research in dairy industry and particularly Kalleh dairy industry are presented in the study:

Firstly, the study contributes to our understanding of emotional intelligence, entrepreneurial personality and innovation phenomena and their measurement by examining the dimensions of this construct.

Secondly, emotional intelligence concept is measured by breaking down this construct into the sub components and the relations between these sub components are tested.

According to the statistical results, Use of Emotion (UOE) was not loaded significantly as an emotional intelligence factor for Kalleh dairy industry from Iran. Although the Use of Emotion (UOE) is a critical factor for the emotional intelligence, our research suggests that it is not a key dimension of Kalleh Company emotional intelligence.

This study is consistent with the observation of Chizri et al., (2013) that Self-Emotions Appraisal, Others-Emotions Appraisal and Regulation of Emotion have significant effect on entrepreneurial personality. The difference is that, Chizri et al., (2013) showed that Use of Emotion has a significant effect on entrepreneurial personality.

The Results of study showed a significant effect of Emotional intelligence dimensions on innovation and entrepreneurial personality in Kalleh Company. In addition, more specific analysis on each of the emotional intelligence dimensions (self-emotions appraisal, others-emotions appraisal, use of Emotion, and regulation of Emotion) revealed that except use of Emotion, all of them enhanced innovation and entrepreneurial personality in Kalleh Company. Today, organizations seek for entrepreneurial personality and innovation in order to survive in the competition scene. Due to the necessity of entrepreneurial personality and innovation in any organization, this study investigated the effect of emotional intelligence dimensions on entrepreneurial personality and innovation in Kalleh dairy industry from Iran.

Suggestions for future research

Thus this study provides opportunities for future research. First, researchers should replicate this study with different

samples, in different industries and considering other potential antecedents of the emotional intelligence entrepreneurial personality and innovation. Conceptually, positivity and its underlying assumptions have been criticized as cultural base and thus not necessarily as relevant to non-western societies. However, recent empirical findings show that these cultural differences may be smaller than anticipated.

Based on the above point of view, we advise managers who work in organizations lacking emotional intelligence and entrepreneurial personality to keep the following points in mind:

-Training or encouraging experts and employees to participate in decision making may help them cultivate a positive feeling of emotional intelligence and entrepreneurial personality.

-Enhancing or encouraging experts and employees to take part in new ideas and to run the company with employers, this will be in favor of enhancing their sense of responsibility toward the company and activating their positive attitude toward work.

-The organizations should give a fair evaluation and a fair treatment to their experts and employees, so that employees will feel their work achievements are valuable and recognized.

Innovative competitors and improving performance, promoting creativity is a need, rather than an option. Organizations need to facilitate the creativity of their employees and promote their entrepreneurial personality. suggests that Innovation may develop through techniques such as: (a) implementing appropriate goal setting; (b) breaking down complex, difficult, or long-term goals into manageable sub-goals; (c) adopting delegation and empowerment initiatives; (d) showing confidence in employees; (e) preparing employees to deal with contingencies and making them ready for multiple possibilities; and (f) helping employees to re-goal, readjusting goals when blockages are encountered. Psychological capital may also develop through neuroscience. With these hope raising tools, managers and organizations may also stimulate other positive consequences of this psychological strength, including workplace performance, job satisfaction, work happiness, and organizational commitment.

Implications for research

This study can have several implications for research and practice. Beyond addressing the limitations of the

present study, there are several implications for future research that examines the potential impact of emotional intelligence and entrepreneurial personality. There is a growing body of research investigating antecedents of emotional intelligence, entrepreneurial personality and innovation. For instance, research indicated that workplace support facilitates emotional intelligence and entrepreneurial personality development among experts and employees, however comparatively little is known about the actual process by which perceptions of workplace support translate into increased emotional intelligence, entrepreneurial personality and innovation. The combination of all emotional intelligence dimensions (Except Use of Emotion (UOE) dimension) suggests this fact to the policy-makers to pay attention to all elements as a whole and not one by one. Therefore, a systematic approach is preferred to enhance the employees' emotional intelligence in industry.

Additionally, there are potential implications for practice among organizations. Today's job environment is characterized by constant change. Change is often a source of anxiety. Developing an individual's emotional intelligence, entrepreneurial personality and innovation capacities can provide them with meaningful confidence and other psychological tools to effectively navigate organizational change. Many organizations adopt training and development programs often focus on enhancing employees' knowledge and skills necessary for current or future job needs. Given the rapidly growing body of research on emotional intelligence and its relationship with positive organizational outcomes, organization ought to seriously consider incorporating strategies aimed at enhancing employing emotional intelligence, entrepreneurial personality and innovation capacities. Furthermore, with respect to intra-correlations between the dimensions of emotional intelligence, managers can increase each of the dimensions through creating and reinforcing a productive environment in order to enhance the emotional intelligence and then entrepreneurial behavior in their organizations. Finally, we believe that emotional intelligence has a bright future in entrepreneurship research. Emotional intelligence could be investigated in the creation process and opportunities identification or as a factor promoting the leadership of the entrepreneur and business performance. An odd finding of this study, based on the empirical results of the path analysis, was that of the components of emotional intelligence as suggested by Crowne (2007), Use of Emotion (UOE) was not loaded significantly as an emotional intelligence factor for Kalleh dairy industry from Iran, In the event that other organizations may play

an important role.

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**Table 1: Validity Coefficients of Independent, dependent variables**

Various Dimension	Self-Emotions Appraisal	Others-Emotions Appraisal	Use of Emotion	Regulation of Emotion	Emotional intelligence	Inno-Vation	Entrepreneurial personality
Validity coefficient	0.88	0.76	0.87	0.87	0.92	0.90	0.89

**Table 2: Reliability and average variance extracted for principal construct**

Research variables	CR	AVE	CR>AVE
Self-Emotions Appraisal	0.83	0.56	✓
Others-Emotions Appraisal	0.79	0.53	✓
Regulation of Emotion	0.86	0.62	✓
Emotional intelligence	0.72	0.58	✓
Innovation	0.87	0.64	✓
Entrepreneurial Personality	0.89	0.64	✓

**Table 3: Model fitting indicators**

Indicator	Value	Acceptable limit	Result
$\chi^2/df$	2.72	Between 1 to 3	Acceptable
Non-Normed fit index (NNFI)	0.968	>0.90	Acceptable
Goodness of fit index(GFI)	0.924	>0.90	Acceptable
Adjusted goodness of fit index (AGFI)	0.907	Close to one	Acceptable
Incremental fit index (IFI)	0.97	>0.90	Acceptable
Comparative fit index (CFI)	0.901	>0.90	Acceptable
Square root mean square error of assessment (RMSEA)	0.047	<0.08	Acceptable

**Table 4: Correlation matrix of research variables**

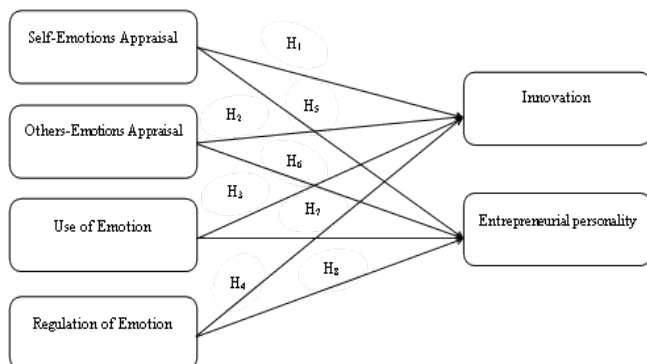
	Mean	SD	Self-Emotions Appraisal	Others-Emotions Appraisal	Regulation of Emotion	Innovation	Entrepreneurial Personality
Self-Emotions Appraisal	4.01	0.81	1.00				
Others-Emotions Appraisal	3.26	0.71	0.59	1.00			
Regulation of Emotion	3.85	0.77	0.83	0.77	1.00		
Innovation	3.61	0.75	0.60	0.54	0.85	1.00	
Entrepreneurial Personality	3.45	0.71	0.55	0.64	0.83	0.62	1.00

**Table 5: Standardized structural path analysis results**

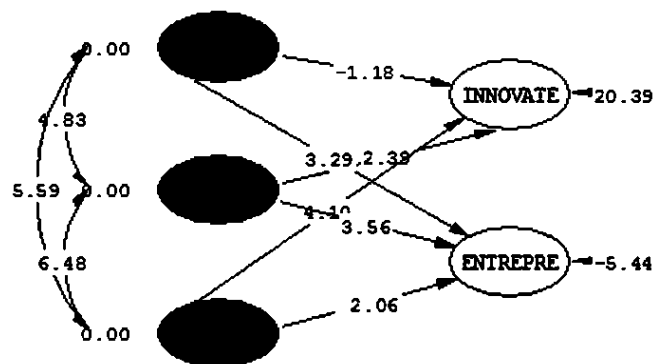
	Standard parameter estimates	T-value	Significance
H <sub>1</sub> : Self-Emotions Appraisal (SEA) → Innovation	0.13	-1.18*	p> 0.01
H <sub>2</sub> : Others-Emotions Appraisal (OEA) → Innovation	0.21	2.39	p> 0.01
H <sub>4</sub> : Regulation of Emotion (ROE) → Innovation	0.33	4.10	p> 0.01
H <sub>5</sub> : Self-Emotions Appraisal (SEA) personality→ entrepreneurial	0.28	3.29	p> 0.01
H <sub>6</sub> : Others-Emotions Appraisal (OEA) personality→ entrepreneurial	0.30	3.56	p> 0.01
H <sub>8</sub> : Regulation of Emotion (ROE) personality→ entrepreneurial	0.19	2.06	p> 0.01

Note: \*Not accepted

**Figure 1: Research conceptual framework**



**Figure 2: The results of final model (t-value)**



Chi-Square= 769.97, df= 283, P-value= 0.16029, RMSEA= 0.047

# THE ANALYSIS OF TECHNOLOGICAL CAPABILITIES IN THE IRANIAN SPACE INDUSTRY THROUGH STRUCTURAL EQUATIONS MODELING APPROACH

A. Khamseh★ B.S. Khodabandeh★★ F. Baghban Kondori★★ Z. Rostami★★

*Since the development of technology is directly linked with the economic development of an organization, the more technology is crucial in creating a competitive advantage in an institution, there will be more concentration on technological development. Conversely, if a technology is ineffective in enhancing competitiveness and creating a competitive advantage, the progress is not appreciated by the organization and is continuously left unsupported. Technological needs assessment not only identifies weak and problematic areas of a firm, but also highlights the relative advantages of any organization. This paper intended to employ Technological Needs Assessment (TNA) as a model to analyze the level of technological capabilities in the Iranian Space Research Institute. This model comprises 9 dimensions examining the capability of the firm. Each dimensions identifies the status of the firm, clarifies the current gap, and finally evaluates the model through structural equation modeling through rating the capabilities. The purpose of this article is to investigate and analyze the levels of the technological capabilities of the Airspace Research Institute of Iran by using TNA Model. This model has investigated the capability level of this center through 9 aspects and has identified the ability of this institution in each aspect and has delivered the available gap. Also, the fitting of the research model has been studied by the structural equation and the aspects of the capabilities have been ranked. So, in this regard, this research has the innovation.*

*Keywords: Technology; Technology Assessment; Technology Need Assessment; Technology capability*

In an area of increased competition, the importance of achieving high levels of customer satisfaction has gained the attention of researchers and practitioners alike. This is especially the case in the service sector, where many companies are focusing upon service quality improvement issues in order to drive high levels of customer satisfaction (Kumar, Smart, Maddern, & Maull, 2008).

If a technology is ineffective in enhancing competitiveness and creating a competitive advantage, the progress is not appreciated by the organization and is continuously left unsupported. Planning and prioritization for development of a firm should focus on the important role of activities in creating competitive edge, so as to promote efficiency in operations, enhance production surplus and eventually facilitate the allocation of various resources to next development of technology. Nowadays, along with the advancement of technology at different levels and the necessity to utilize modern technologies, it is critical to evaluate technology more than ever. Therefore, the current status of technological capabilities need to be assessed prior to development and implementation of new technologies (Khamseh and Mohtadi, 2015).

One of the most important factors in the failure of firms utilizing technology for gaining competitive advantage in the developing countries is the lack of knowledge about the technological capabilities of enterprises and

how they can be employed to build relative advantages. Technological needs assessment is a tool used to determine the functionality required to implement technological priorities.

Planning and prioritization for development of a firm should focus on the important role of activities in creating competitive edge, so as to promote efficiency in operations, enhance production surplus and eventually facilitate the allocation of various resources to next development of technology. In this regard, the grave importance of technology development has compelled the senior business executives to gain a profound understanding of technological capabilities of their organizations, identify the technological developments in the world and monitor the competitors' efforts to acquire new technologies, and constantly improve the technological capabilities of their organizations. The technological needs assessment model has been designed as a tool for identifying potential requirements for implementation of technological priorities in developing countries. (Unido, 2002).

The majority of research today is based on data collected from the relevant subject matter, where data analysis is

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the single most important part of research. The raw data are analyzed using statistical techniques, which are then processed as information and delivered to the users. In fact, the factor analysis is followed by evaluation of the original research model. The research questions are then tested. Structural equation modeling is employed to analyze research questions through PIs. This method makes it possible to examine the validity of questions and the significance coefficients of results.

Structural Equation Modeling is a powerful tool for testing causal relationships. Its increasing use in academic and practitioner studies reflects the versatility of the approach and its increasing accessibility to users. The time taken to learn how to use SEM has been considerably reduced as a result of increasingly user friendly graphical interfaces. However, the user should avoid the temptation to blindly believe the output from running a model, which can be extremely voluminous and a sound understanding of basic statistics is essential before using structural equation techniques (Gallagher, Ting, & Palmer, 2008).

Structural Equation modeling, or SME, is a very general statistical modeling technique, which is widely used in the behavioral sciences. (HOX & Bechger, 1998).

## I. Review of Literature

Studies on technological capabilities are extremely relevant, not only to industrialized countries but also to developing ones. This is due to the fact that the environment is forcing companies to develop skills that allow them to implement technological changes in order to stay competitive (Lopez, Lopez, & Molina, 2014).

Technology Management Capability measurement is being emphasized as an important research field in the technology Management discipline which continues to be developed by interdisciplinary interactions (Tunçay & Cilingir, 2013).

Assessment is an estimating tool that expands understanding about the dimensions of a technology and its relationship with a broader chain of technology in order to make better organizational decisions. Perhaps, it can be argued that assessment is a tool that assists in the formation of knowledge management pyramid. In other words, it can help promote data into information, then into knowledge and ultimately into organizational wisdom, which is a fundamental tool for decision-making. Technology assessment generally refers to a process whereby a systematic strategy is adopted to examine the effects of introduction, development, improvement of technology in

an enterprise or a community (Tabatabaeian, 2005).

In any appropriate technological selection, it is crucial to fulfill the interests of society and those of the institution through proper assessment. Technology takes place within a human environment, interacting with different physical environments and human mediums including economic system, social system, cultural system and other constituent political systems. In other words, different technologies influence different human systems, which in turn lead to certain reactions, where technology assessment should be conducted through an inclusive attitude. In examining the advantages and limitations of technology, the major criterion is not only the economic effectiveness and efficiency. It rather takes place in relation to the human surrounding environment. The concept of technology assessment involves minimization of positive effects and development of environmentally-friendly technologies along with the surrounding environment.

Nowadays, along with the advancement of technology at different levels and the necessity to utilize modern technologies, it is critical to evaluate technology more than ever. Technology Assessment can provide a conceptual framework as a tool to gain a better understanding of technology and make correct decisions; Therefore, the current status of available technology needs be assessed prior to development and application of new technology.

In any appropriate technological selection, it is crucial to fulfill the interests of society and those of the institution through proper assessment. Technology takes place within a human environment, interacting with different physical environments and human mediums including economic system, social system, cultural system and other constituent political systems. In other words, different technologies influence different human systems, which in turn lead to certain reactions, where technology assessment should be conducted through an inclusive attitude. In examining the advantages and limitations of technology, the major criterion is not only the economic effectiveness and efficiency. It rather takes place in relation to the human surrounding environment. The concept of technology assessment involves minimization of positive effects and development of environmentally-friendly technologies along with the surrounding environment.

On the other hand, production companies and corporations have always been involved in a great deal of practical issues such as purchasing, selling, supplying raw materials, accounting, insurance, etc. Furthermore, the drastic changes occur in any competitive environment. Hence,

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the utilization of models and methods of technology assessment no longer work long in such businesses. In other words, managers and technical experts in companies and organizations take their experiences gained previously so as to subjectively determine the company's capability in various fields of technology. In order to remain competitive these days, organizations have to evolve through technology and development those advanced technologies. (Jafarnejad & Morovati, 2006).

It seems that the perfect tool for verifying such subjective estimates involve technological capability models. Experience has proved that models and methods used in a company should entail two fundamental functions: Firstly, they need to be simple and accessible. Secondly, they need to achieve acceptable results within a short time (Tabatabaean, 2005). Another dimension of assessment involves technological capabilities. Technological capabilities cover a broad concept reflecting the ability to make effective use of technology and the ability to change and innovate the technologies (Kian, 2005). The following classification represents the factors contributing to technical capabilities:

A) Production and capacity of utilization: It refers to knowledge and skills required for production, such as the capability of manufacturing processes, machinery, production management and engineering.

B) Investment capabilities: It includes trained manpower needed to transfer skills and ability to analyze proper investment in a particular project and the ability to implement projects.

C) Capability to adapt with small changes: It refers to knowledge and skills required for planning and implementing the transfer of technology and slight changes in order to improve the existing processes and respond to different situations.

D) Capability of innovation or making major changes: It refers to capabilities needed for basic processes (R&D) for internal research and development to improve products and procedures. The capabilities of major changes could include the ability to improve innovation and technology beyond the primary design parameters (Kian, 2005). There are different models in connection with assessment of technological capabilities categorized in three broad items displayed in Table 1.

## II. Research Design & Methods

Technology assessment revolves around the interaction

between development of science, technology and decision-making processes concerning such development. Technology assessment assists any organization to determine the current needs and opportunities as well as the fundamental design of technology. In order to assess the technological capabilities of a firm, the technological needs assessment was adopted in this study. According to this model, the capabilities of a firm is measured based on a 9-dimensional questionnaire. Classification of technological capabilities in this mode include: (InnoSupport, 2007):

Awareness: Recognizing the need to improve the firm's knowledge and technology;

Search: The company's ability to identify opportunities and threats concerning technological capabilities;

Building core competence: The company's ability to create core competencies (distinction between competitors);

Technology strategy: The company's ability to develop an appropriate strategy to support the business;

Assessing and selecting technology: The company's ability to evaluate and select a suitable technological solution;

Technology Acquisition: The company's ability to obtain and utilize a technology;

Implementation and absorbing technology: The company's ability to participate in implementation and effective use of technology;

Learning: The company's ability to learn from previous experiences so as to improve technology and new products;

Exploiting external linkages and incentives: The company's ability to communicate with the network of supply and operation through external links (universities, consulting firms and research cooperation, public incentives, etc.).

All data are presented in fig 1:

An enterprise without the knowledge of strengths and weaknesses and without the knowledge of environmental changes would not be able to devise any strategic plans for future activities. Technology assessment in a firm deals with the issue which technology can work better, be cheaper and easier than other technologies, so that firms can create competitive advantage. According to the technology capability assessment model based on the classification shown in Table 2, firms are divided into four types in terms of capabilities:

The first type of firms (passive): It refers to a firm unaware

of their needs for technology transfer and environmental improvement, unable to understand which technological capabilities should be improved. Hence, it is unlikely that such a firm adopt a stable policy within a critical environment.

The second type of firms (active): These firms identify the need to improve technological capabilities for achieving growth and development, but they only respond to environmental threats due to the limited internal resources (lack of key skills and personal experience), thus failing to take advantage of current events.

The third type of firms (strategic): These firms are well aware of how to improve their technological capabilities, adopt a strategic approach and are highly capable of implementing their projects.

The fourth type of firms (creative): Most of these firms (such as Microsoft, Ford, etc.) gain moderate or high incomes and perform quickly in improving their technological capabilities.

### Overview of indicators

Table 2 shows the classification of technological capabilities based on technological needs model. These indicators are used in constructing a questionnaire collecting information.

#### Research population

The population consisted of 26 managers and experts from engineering, research and development, planning and production of the Iranian Space Research Institute with a doctorate and master's degrees selected through census. In order to better understand the population in which the research was conducted, it is necessary to analyze and describe the data. Moreover, the statistical description of data is conducted as a step to identify the underlying model and the basis for explaining the relationship between the variables.

All information have been provided in table 3:

#### Objectives and research questions

The aim of this study was to evaluate the technological needs of Iranian Space Research Institute. In terms of purpose, it was an applied survey. The research questions were:

What is the level of capabilities at Iranian Space Research Institute based on TNA?

How wide is the technological gap within the dimensions of capabilities?

What is the ranking of technological capabilities?

## III. Analysis, Discussion & Findings

Findings of the first research question: Table 4 shows the percentage of average capability for level of technology dimension.

#### Overview of theoretical model

The validity of the theoretical model was tested and the significance coefficients were calculated through structural equation modeling by PLS. Structural equation modeling is a very general multivariate analysis technique derived from multiple regressions as an extended version of "general linear model" that enables the researchers to simultaneously examine a set of regression equations. The structural equation modeling provides a holistic approach to test the hypotheses about the relationships between observed and latent variables. Among all the multivariate analysis techniques, only structural equation model involves simultaneous application of multiple regression analysis and factor analysis.

What makes structural equation model is a powerful technique widely used among researchers is the easy interpretation through convenient interface, where a set of relationships between variables are calculates at the same time. As Hare argued, "none of the previous methods could simultaneously measure the model and calculate the causal relationships." Generally, structural equation model can reveal the the structure of internal relations of variables through a set of equations similar to multiple regression (Amani, Khezri, & Mahmoodi, 2012). Therefore, structural equation modeling is employed to analyze research questions through Pls.

#### Validation of the model

In this study, the test was evaluated through PLS. All information are provided in figures 2-5:

- Findings of the second question: At the Iranian Space Research Institute, there is a technological gap between current and desired levels, concerning which the

administrators need to adopt useful strategies. According to Table 5, the technological gap can be found at different levels as illustrated in Figure 6.

- Findings of the third question: In order to rank the dimensions of technological capabilities.

Table 6 shows a significate correlation coefficients with the effective ranking.

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## Overall model fitting

GOF(Goodness of Fit) is a criterion adopted to evaluate the overall fitting through, covering three values of 0.01, 0.25 and 0.36 for weak, medium and strong GOF (Manuel, Francisco, & Félix, 2009; Vinzi, Chin, Henseler, & Wang, 2010). This measure was calculated by the following formula:

$$GOF = \sqrt{(\text{communalities} \times R^2)} \quad (1)$$

Communalities are The mean value of shared variables obtained the latent variables.

Table 7 shows a communality and R2 variables.

And table 8 shows the result of overall model fitting.

According to the value obtained for GOF at 0.82, the good fitting of the model is verified.

## IV. Conclusion

The level of technological capabilities at the Iranian Space Research Institute falls under the category B of companies (active). According to Table 2, these firms identify the need to improve technological capabilities for achieving growth and development, but they only respond to environmental threats due to the limited internal resources (lack of key skills and personal experience), thus failing to take advantage of current events. These companies are inefficient in all major arenas, acquisition and exploitation, development, technology strategy, thus requiring a major improvement plan. Figure 2 illustrates the levels of technological capability in different aspects of space research institute. According to Figure 2, the lowest gap is in core competency while the greatest gap can be found in technology absorption and utilization. The warning level is where the capabilities need serious steps taken towards improvement, while desirable level requires all the sectors to integrate. In this project, statistical data were collected through analysis of responses provided by subject matter experts.

According to the findings of the paper, as shown in Figure 4, the indices that have more  $r^2$  represent the most influential power on the respective platform; therefore, they require special attention and, in this regard, there have been offered some suggestions (The purpose of  $r^2$  is the share that every question has in determination of its variable):

In awareness aspect, the index of awareness about the commercial technologies, there has been achieved  $r^2$  more than the results of PLS; therefore, it is recommended: the firm joins in the organizations and participates in seminars

related to the topic, as well as, sends employees to the advanced countries in to gain knowledge of commercial technologies.

In the search aspect, the index of the evaluation of technological opportunities, there has been achieved  $r^2$  more than the results of PLS; therefore, it is recommended: the company audits the technology in order to identify the strengths and weaknesses of the organization's technological assets.

In the aspect of the core competencies and the technology strategies, the awareness index of the external and internal technological resources, there has been achieved  $r^2$  more than the results of PLS; therefore, it is recommended: the company should do the strategic plan and communicate with knowledge-based companies in order to be aware of the new technologies.

In the aspect of the evaluation and selection of technology and technology acquisition, the awareness index about the best technological resources and the index of the effective acquisition of the technology from foreign sources, there has been achieved  $r^2$  more than the results of PLS; therefore, it is recommended: the company should perform complete researches on the life cycle of the technology. Also, it is better, in this regard, to use the knowledge and experiences of the foreign researchers.

In the aspect of the usage and the absorption of the technology and learning, the index of the suitable organizing of the technological activities of the institutions according to future technological projects, there has been achieved  $r^2$  more than the results of PLS; therefore, it is recommended: the company implements and makes effective use of technology as well as to learn from the previous experiences in order improve the technology and new products.

In the aspect of the exploitation from the external links, the index of the use of cooperation of universities has  $r^2$  more than the results of PLS; therefore, it is recommended: the joint projects should be defined between companies and universities. Also, the company should collaborate with the consulting and research institutions.

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**Table 1: Classification of technological capability assessment models (Radfar & Khamseh, 2015)**

<b>Models of determining technology gap</b>	<b>Models of assessing the incidence causes of technology gap</b>	<b>Models of providing the guide lines to compensate the technology gap</b>
Atlas of technology model	Ford models	Ford model
Porter's model	Lindsay model	Lindsay model
Panda and Ramanathen model	Atlas of technology model	Phaal model
Floyd model	Floyd model	Garcia-Arreola model
Management technology needs model	Management technology needs model	Lin model
Technology assessment content model	Model of technology capability levels model	Management technology needs model
Technology status assessment model	Ford models	Technology and Science management information model
Economic value added model	Lindsay model	Technology needs assessment model

**Table 2: Classification of technological capabilities based on technological needs model (Radfar & Khamseh, 2015)**

Dimensions	Indicator	Indicators
Awareness	1	Awareness of business technologies
	2	The role of technology in business strategy
Search	3	Assessment of technological opportunities
	4	Evaluation of technological weaknesses
Building a core competence	5	Special technological abilities
	6	External and internal information technology resources
Technology strategy	7	Management skills in developing a technology strategy
	8	Understanding the basic technological priorities
	9	Obtaining a proper vision
Assessing and selecting Technology	10	Knowledge of technological selection
	11	Knowledge of the best technology resources
Technology Acquisition	12	Effective acquisition of technology from foreign sources
	13	Communicating with foreign suppliers of technology
Implementation and Absorbing technology	14	Appropriately organizing technological activities
	15	Transparency of the process of technological projects
Learning	16	Appropriate technology assessment system
	17	Concentration of future technology projects
	18	Ability to learn from one technology to another
Exploiting external linkages and incentives	19	Use of government incentive policies
	20	Employing consultants to evaluate technology
	21	Recruitment of individuals outside the company for technological development
	22	Using other companies in implementing a technology strategy
	23	Using university collaboration
	24	Cooperation with government research centers

**Table 3: Details of study population**

SEMAT	Number	Average work experience	Education level
Project manager	5	15	PhD
Subsystem Manager	9	10	Master's degree
Technical expert	12	8	Master's degree

**Table 4: Current status of technological capabilities**

Symbolic signs	Dimensions	Number of indicators	Average capacity available
AW	Awareness	2	48.56%
SE	Search	2	42.69%
CC	Building a core competence	2	58.08%
TS	Technology strategy	3	37.76%
AST	Assessing and selecting technology	2	43.65%
TA	Technology Acquisition	2	35.38%
IAT	Implementation and absorbing technology	2	30.87%
LE	Learning	3	36.47%
EEL	Exploiting external linkages and incentives	6	45.80%

**Table 5: Comparing the different levels of technological capability available**

Dimensions	Number of indicators	Average capacity available	Desirable level	Warning level	The ideal level
Awareness	2	48.56%	64.23%	42.23%	100
Search	2	42.69%			
Building a core Competence	2	58.08%			
Technology strategy	3	37.76%			
Assessing and selecting Technology	2	43.65%			
Technology Acquisition	2	35.38%			
Implementation and Absorbing technology	2	30.87%			
Learning	3	36.47%			
Exploiting external linkages and incentives	6	45.80%			

**Table 6: Results of direct relationship and significant coefficients with effective ranking**

Path	Symbol	Path coefficient	Significance	Rating of factors
First	5.312	0.286	EEL-TC	Exploiting external linkages and incentives
Second	15.576	0.218	LE-TC	Learning
Third	6.263	0.146	SE-TC	Search
Forth	9.035	0.136	TS-TC	Technology strategy
Fifth	4.060	0.116	AW-TC	Awareness
Sixth	14.770	0.114	AST-TC	Assessing and selecting Technology
Seventh	9.456	0.114	IAT -TC	Implementati on and Absorbing technology
Eighth	8.029	0.087	CC-TC	Building acore Competence
Ninth	6.315	0.053	TA-TC	Technology Acquisition

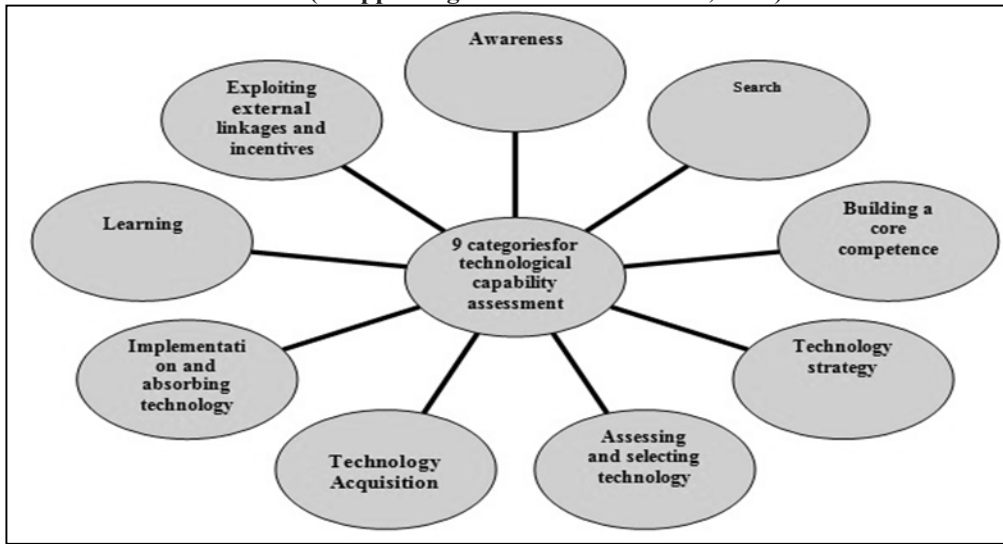
**Table 7: Commuality and R2 variables**

Latent variables	Commuality	R <sup>2</sup>
Awareness	0.900089	000
Search	0.756393	000
Building &Core Competence	1.000000	000
Technology Strategy	0.440585	000
Assessing and selecting technology	0.508452	000
Technology acquisition	1.000000	00
Implemental on and absorbing technology	0.568611	000
Learning	0.706284	000
Exploiting external linkage and incentives	0.517237	000

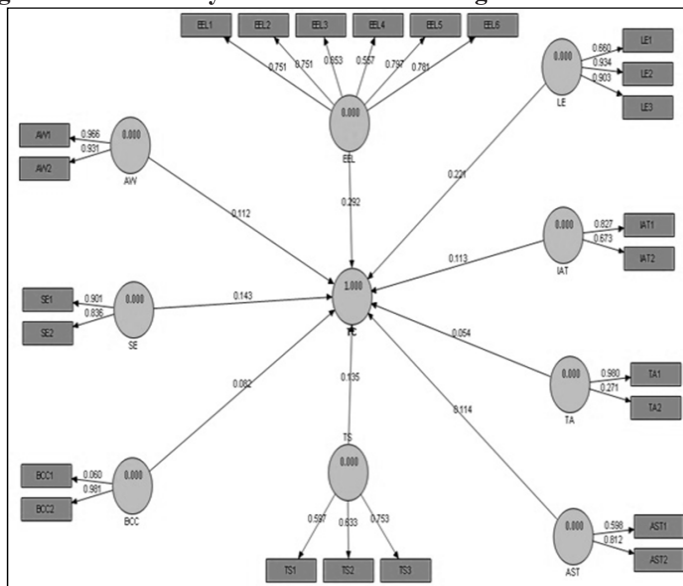
**Table 8: Results of overall model fitting**

GOF	R <sup>2</sup>	Commuality
0.882	1	0.677

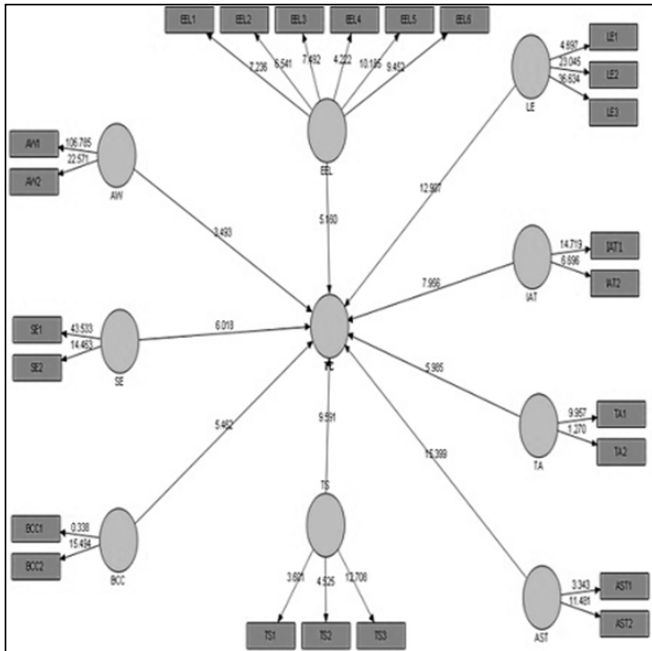
**Figure 1: Classifying the dimensions of technological capabilities based on technological needs model (“Supporting Innovations in SME”, 2007)**



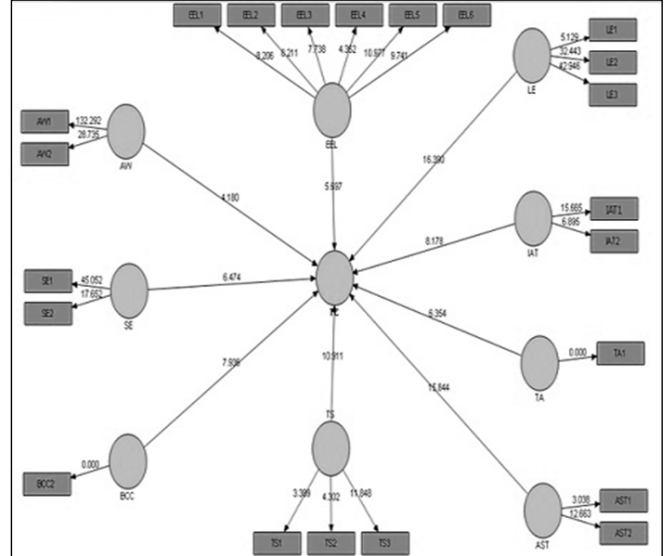
**Figure 2: Preliminary structural model along with factor load coefficients**



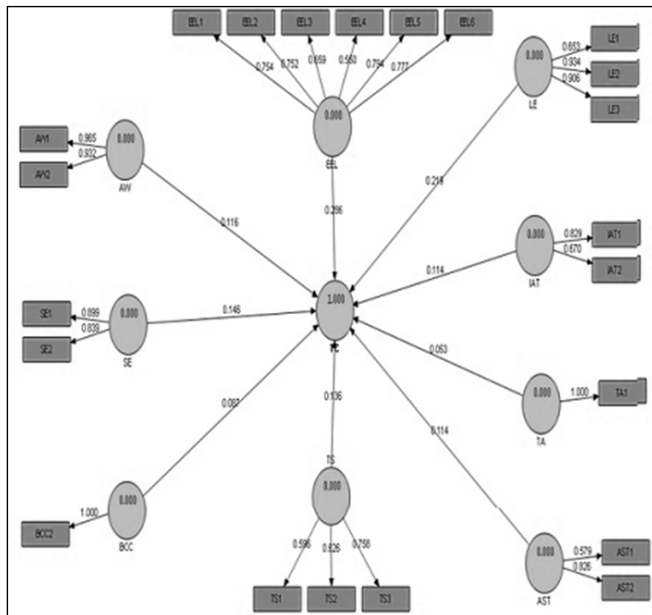
**Figure 3: Preliminary structural model along with significant coefficients z**



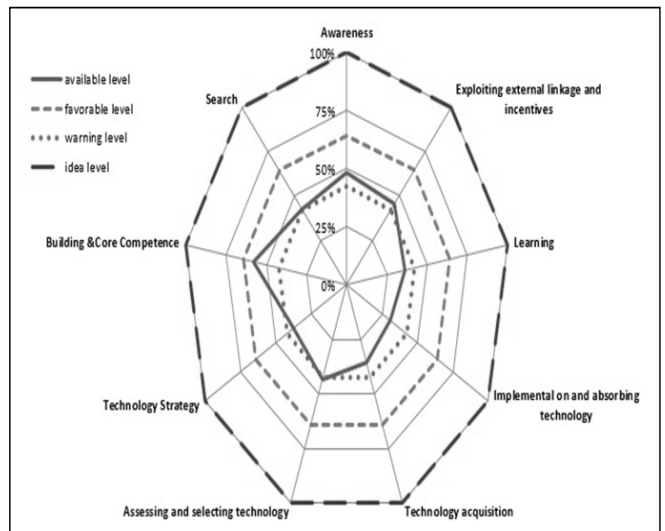
**Figure 5: Confirmed structural model along with significant coefficients z**



**Figure 4: Confirmed structural model along with factor load coefficients**



**Figure 6: Levels of technological capability in different aspects of space research institute**



## JUGAAD ENTREPRENEURSHIP: A CROSS BETWEEN STREET AND SOCIAL ENTREPRENEURSHIP

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*Jugaad is a demotic Hindi word that's used in the context of something that's a mix of creativity, innovation, and cleverness. The word is used in adjective and noun forms. So, one could have a "Jugaad" approach to solving a problem, or one could be using a product of "Jugaad" inventiveness. The spirit of Jugaad is embodied in the ability to work with limited available resources, but also building something relevant and useful. Similarly, Entrepreneurship involves a constant craving for the goal under acute adversities. An entrepreneur would certainly favor minimizing investment costs and maximizing the profit. Thus, Jugaad provides the shortest and the easiest of the ways to be a successful entrepreneur. As a developing nation India, particularly need entrepreneurs to solve certain social issues with minimal resources. It may be quoted as Frugal Social Entrepreneurship, which is now an Indian trademark because lack of financial support, entrepreneurs try to make something utile even out of junks such as keeping old equipment running with improvised spare parts is a classic example of street entrepreneurship. The present research article takes on Jugaad entrepreneurship, which is actually a blend of social and street entrepreneurship. Several case studies of street entrepreneurs from India are quoted here are of those who have presented answers to social problems via their Jugaad. The article is theoretical in nature, adopted case study approach and based on observation, primary and secondary data.*

*Keywords: Jugaad, Social Entrepreneurship, Street Entrepreneurship, Frugal Innovation, India*

As the global economic turbulence continues, the west is looking east not just for new markets, but new inspiration and the answer is Jugaad: a 'frugal' form of innovation cultivated in India. 'Jugaad' is a Hindi word that describes an improvised or makeshift solution using easily available resources. It is the ability of an enterprising person to innovate or to make do with less. In fact, it could be linked with Charles Darwin's theory of survival of the fittest meaning adaptations with innovations with minimal resources. In this sense, it could be a positive and unique approach to innovation in order to provide answers to social problems. In a business context, Jugaad is a "frugal, flexible, and inclusive approach to problem solving and innovation" (Radjou, Prabhu and Ahuja, 2012). Jugaad is an antidote to the complexity that characterizes Indian markets, with mind-boggling diversity, pervasive scarcity of all kinds, and exploding inter-connectivity. This highly resource-constrained and chaotic environment in Indian markets motivates street entrepreneurs to practice the art of Jugaad to create products and services that are extremely affordable and highly sustainable. The present research paper aims at Jugaad entrepreneurship and exploring its relationship with social and street entrepreneurship also presenting case studies from Indian street entrepreneurs who adopted Jugaad approach to solve social problems.

Theoretical Frame Work

Defining Jugaad:

Jugaad is a slang for the Hindi word "Jugaat" which has its root in the Sanskrit word "Yukti", which means innovative solution to the existing problem and adverse situations. "Jugaad" means an improvised or quick-fix solution and inventiveness to the problem. It literally means an arrangement or a work around which has to be used because of lack of resources.

In a broader sense, the term Jugaad Innovation is known these days as frugal innovation, i.e. 'Doing more with less'. Entrepreneurs in India have been practicing frugal innovation for a long time, born out of necessity to address a very large consumer base, albeit with low purchasing power. Jugaad also has a certain localized meaning, and the spirit in which Jugaad innovation is carried out sometimes has a very local hand stamp. However, in business and management Jugaad can be defined as "Lowcost, sustainable frugal innovation in process, products, and/or services done locally, and with astrategic intent/purpose."

Explaining Street Entrepreneurship:

Street entrepreneurship primarily includes earning one's

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livelihood by the art of doing a business on the local streets, railway platforms, footpaths, etc. Street Entrepreneur is a simple concept of making nothing into something, using everyday knowledge, free information to direct to the tools one need to create a business that will bring a great income if he puts forth the effort. In India Street entrepreneurs are characterized by their low income, low literacy, low skills, limited infrastructure, limited resources and are severely constrained by lack of income. Thus, in order to survive, they are forced to opt for innovative ways; i.e. forced frugal innovation (Jugaad); to meet their objectives. It's less about looking for the perfect solution in a text book, but a solution that suited at one moment in time, in one particular situation.

What is Social Entrepreneurship?

A social entrepreneur is someone who recognizes a social problem and uses entrepreneurial principles to organize, create, and manage a venture to make social change (a social venture). This Social entrepreneurship is the process of pursuing innovative solutions to social problems. More specifically, social entrepreneurs adopt a mission to create and sustain social value. They pursue opportunities to serve this mission while continuously adapting and learning. They draw upon appropriate thinking in both the business and nonprofit worlds and operate in a variety of organizations: large and small; new and old; religious and secular; nonprofit, for-profit, and hybrid. Hence Social entrepreneurs are individuals with innovative solutions to society's most pressing social problems. They are ambitious and persistent, tackling major social issues and offering new ideas for wide-scale change. Whereas a business entrepreneur typically measures performance in profit and return, a social entrepreneur focuses on creating social capital. Thus, the main aim of social entrepreneurship is to further social and environmental goals. Each social entrepreneur presents ideas that are user-friendly, understandable, ethical, and engage widespread support in order to maximize the number of local people that will stand up, seize their idea, and implement with it. In other words, every leading social entrepreneur is a mass recruiter of local change makers, role model proving that citizens who channel their passion into action can do almost anything.

Jugaad Entrepreneurship: Exploring relationship with Street and Social Entrepreneurship

The conceptual framework set out to explore above mentioned relationship with Jugaad entrepreneurship in the present research paper was developed, considering the

work of Williams & Gurtoo (2012), Mulyawan & Saefulloh (2013), Singh & Gupta (2013).

## Research Design & Methods

The methodology of this qualitative research is based on the observation and adaptation of case study approach to understand the pattern and performance furthermore case presented here are prepared from both primary as well as secondary data.

Research Objective: The rationale or main purpose of the present paper is to study different Indian street entrepreneurs who have done Jugaad innovation in order to solve social problems. The Other objectives are

1. To create the conceptual framework to understand the importance of Jugaad entrepreneurship and its relationship with the street and social entrepreneurship.
2. To discuss the importance of Jugaad entrepreneurship in order to explore new opportunities for growth.
3. To find out how Jugaad entrepreneurs have helped in solving social problems in India.

To develop the case studies primary data were collected through Email correspondences and telephonic interviews while for collection of secondary data; magazines, books, journals, research papers and internet facilities were utilized.

Jugaad Entrepreneurship: Cases from India

Following cases from India has been considered to establish a relationship among Jugaad, Street and Social Entrepreneurship.

Case 1: Green Oil

Anupam Jalote's Green oil is an innovation based social enterprise that produces renewable energy and enriched organic manure. The company has intention to build a 1 MW power plant near City-Jaipur. The mechanism would be like a sophisticated gobar gas plant that uses waste to produce bio-methane through anaerobic digestion. Rotten fruits and vegetables, cattle and elephant dung and other organic farming waste would be used to produce electricity. The company will also be offering the by-product of the process which is organic manure. They are targeting by 2018 to produce over 71 million units (kilowatt hours) of renewable energy annually, along with over 40 million tons of enriched organic manure. Apart from giving back 60 % of their revenue to the community they are also responsible for removing 1.5 tons of waste from the vicinity for every

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megawatt hour (thousand units) of electricity generated. Every thousand units of electricity generated produce enough organic manure to enrich over 15 acres of farmland and reduces chemical fertilizer use by 20%, and removes 6.6 tons equivalent of carbon from the atmosphere.

Highlights of the case: Green Oil adopts the smart way of production with vegetable waste which is a major sanitation issue. It works as an alternate source of energy aiming to solve the social problem of electricity shortage in India also provides cheaper manure in the vicinity.

#### Case 2: “Venus”: Mini Portable Washing Machine

Mumbai based Piyush Agarwalla is an engineering graduate from the US. The idea for a bucket-fitted laundry device came to him when he saw a 40-year-old photo showing something similar, but bigger, from Bulgaria, on the Web. He made it more compact and easy to use. He says, though bachelors and campers are the ones most interested in the Econowash, he hopes to manufacture it primarily for the poor. Contrary to existing bulky and expensive washing machines Econowash is not only easy to handle, but also it is available at the price of INR 1500 only. It works much like an oversized blender, recreating in the bucket the same effect as any larger, more conventional washer would; saving water, electricity, money and space in the process. As per Agarwalla profit from will this venture would be used to support and boost innovations in rural area.

Highlights of the case: Venus; a bucket fitted washing machine is a perfect example of frugal innovation i.e. Jugaad. It is compact, cheaper, faster and available at almost one tenth price of standard washing machines.

#### Case 3: The Banka Biolo

Namita Banka had been working with the Indian Railways to solve its sanitation problems on the train. She adapted the India’s Defense Research & Development Organization’s technology to make bio-loos from recast concrete, cement which cost only INR 25,000 in comparison to the standard cost of INR 4, 00,000. These loos work on the simple mechanism that is in this the bathrooms are fitted with a bio tank, which collects the waste and treats it with bacteria, so that it’s converted into biogas (which can be used as fuel) and water (which can be recycled or discarded). This means no clogging, and no waste. Presently, this loo had been successfully installed at various at construction sites, schools and colleges in different cities of India. If further commercialized and successfully installed these loos could be an answer to India’s one of the most taxing tasks of sanitation.

Findings from the case: Banka Biolo is a smart product as it not only answers social issue of sanitation, but is cheaper and its byproduct could also be used.

#### Case 4: Mitticool Fridge

In year 2002, Mansukhbhai Prajapati a traditional clay craftsman originally belonging to the village Nichimandal of Morbi, Rajkot launched Mitticool fridge, a clay refrigerator for the common man. It runs without electricity on a simple principle – when the clay comes in contact with water, it drops in temperature. Prajapati’s invention uses 10 liters of water to cool down its terracotta clay body to keep a steady temperature of 10 to 15 degrees. This makes it ideal to store fruits and vegetables for five to eight days. Milk products can last up to 24 hours in the fridge and it doesn’t need a replacement for 10 years. His idea for Mitticool came out of 2001 Gujarat earthquaketragedy when a local newspaper published pictures of broken pots, with a caption “Broken fridge of the poor”. This phrase struck him hard. He took a loan of INR 3 lakh, and after a lot of research and experiments, the Mitticool was born. Presently it is available in Gujarat for INR 3,400 and in Mumbai, Delhi and Hyderabad for INR 4,000. Mitticool has won many states, national and international awards like National Innovation Foundation, International Eco Hero (2010), Villgro Grassroots Innovator Award (2011), etc. Mansukhbhai also owns a Patent for this Mitticool refrigerator. Apart from having a line up of more than 7 products, namely Mitti Cool Refrigerator, Non Stick Coated Earthen Tawa, Clay Cooker, Clay Food Plate, Clay Water Filter, Clay Pot and Clay Diva; he is presently working on the idea of a Mitticool house, which won’t require electricity for cooling.

Findings from the case: Mitticool Fridge is an ideal combination of Street and Social Entrepreneurship as it is cheaper, the material is easily available, biodegradable and solves problems of electricity.

#### Case 5: Motorbike Water Pumps

Irrigation is still a challenge for agriculture in India; moreover initiatives taken by the Government are not sufficient as most of the villages lack basic recourses. To deal with such issues Vikas Shinde, a farmer by occupation, has developed a motorcycle operated water pump to irrigate his fields. This innovation was born out of finding a solution of acute shortage of electricity, which tuned electricity pumps a failure; hence the idea of developing Motorbike water pump came to Shinde. Costing about 2000, this Motorbike water pump is very helpful for small scale farmers. The capacity of this pump is 50 liters/cycle

and it takes approx. 10 minutes to complete one cycle so can lift 1200 liters of water in one hour. The cost of operating is also very low since it consumes one liter of petrol for 12 hours of operation. Presently Shinde is supported by National Innovation Foundation (NIF) financially and have filed a patent for the same.

Findings from the case: Motorbike water pump is an excellent example of Jugaad Entrepreneurship as it is made from old gear and spare parts and its operating cost is too low; also provide answers to social problems.

#### Case 6: Haathi Chaap: Elephant Poo Paper

Jaipur is a major tourist attraction in India, especially popular among them is elephant ride. Hence mounds of elephant dung lying around are a common sight. This gave a business idea to Mahima Mehra and Vijendra Shekhawat in the form of paper production and Haathi Chaap (Prints of the Elephant) was born in 2003. On average an elephant takes 250 kgs food and produce up to 100 kgs of dung. Since an elephant's diet is primarily vegetation and digestive system is not proper, hence elephant dung is considered as one of the best raw material to make paper due to its fibrous nature. Paper nature is so far manual and tedious process, however the waste water of cleaning process makes a good fertilizer which is utilized for local cultivation. For initial four years they exported their paper to Germany and UK then they launched them in India. Presently they have stores in all major cities. The process of making paper from elephant dung does not require cutting of trees, no harmful chemicals is used. What it all does is generating local employment.

Findings from the case: Still a cottage industry Haathi Chaap has lots of potential. It ticks many aspects of Jugaad entrepreneurship such as utilizing waste as raw material, providing employment to lower class, byproducts are usable and of course Eco friendly product.

#### Analysis

After studying and analyzing case studies presented above it may be concluded that the Jugaad approach is adopted by street entrepreneurs to solve one or many social problems. They exhibit several characteristics, including:

- Product Innovation to stand in adversity.
- Adopting Jugaad to beat social issues.
- Focus on the grass root customer, hence produces cheaper and offer cost effective innovations.
- Highly adaptable, quickly adjust with change.

Above mentioned characteristics have traces of street as well as social entrepreneurship.

Hence the relationship among Street, Social & Jugaad Entrepreneurship may be summarized as

### Conclusion

In a developing country like India Jugaad Entrepreneurs have lots to contribute; be it on technological front or on sanitation grounds. So far the term comes under the umbrella of social as well as Street entrepreneurship. It actually stands at cross road of these two terms covering their best. The cases reviewed above are benchmarks yet they play a pivot role in society; more ventures could be initiated with the help of financial institutions and government. Further its applicability does not end with India, this form of entrepreneurship could be utilized anywhere in world as it promotes frugal innovations while catering social needs with minimal resources available.

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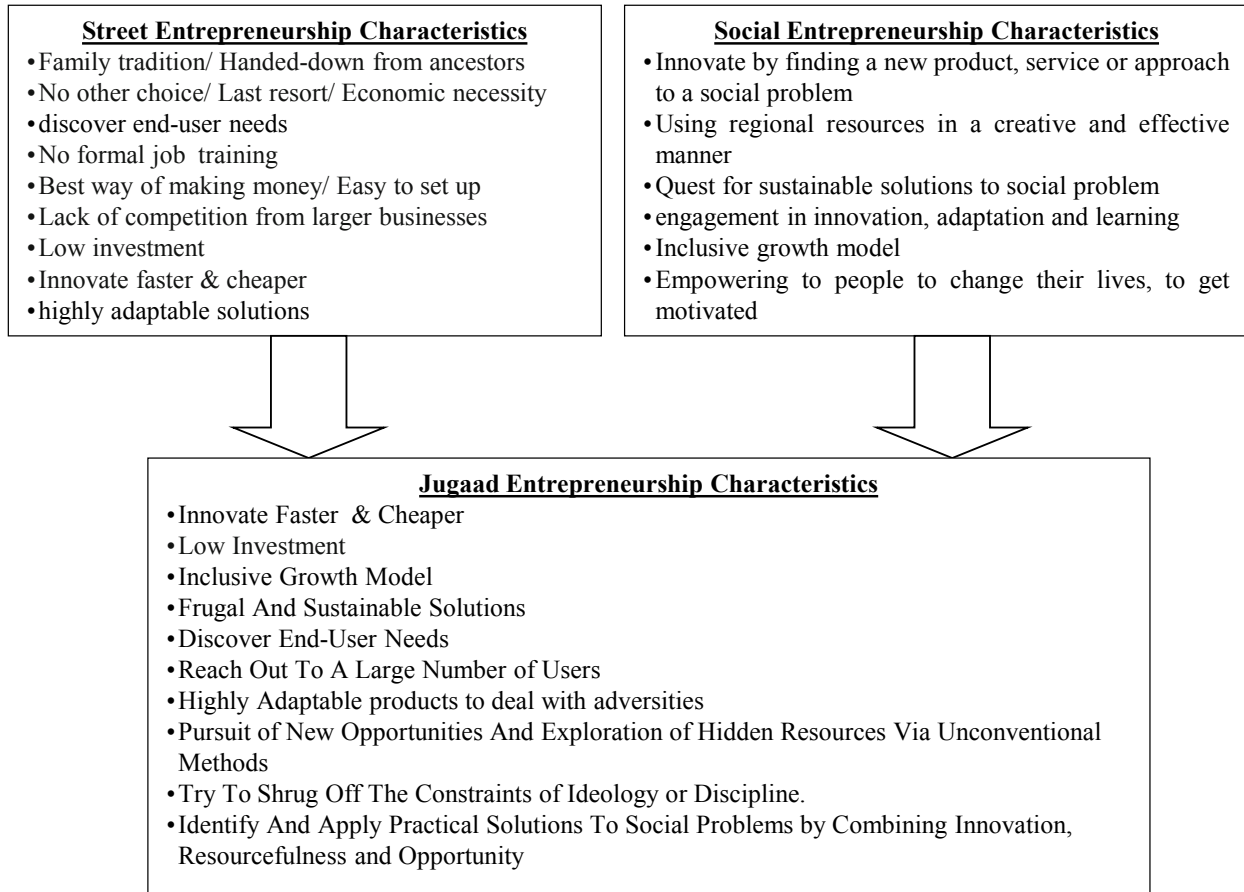
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**Figure 1: Relationship among Street, Social & Jugaad Entrepreneurship**



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