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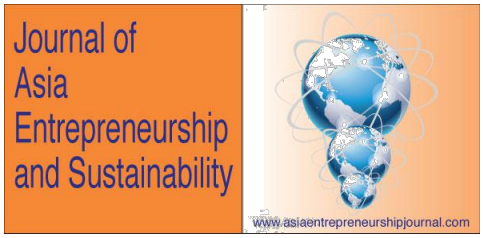

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Hiring a Sustainability Officer Can Save a Sinking Ship: Financial Statement Evidence!

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ABSTRACT

This study compares the financial performance of successful firms and unsuccessful firms that hire a Sustainability Officer (SO). The purpose of this study is to find support to whether investing the time and resources to hire a SO improve firm performance on key economic metrics.

Success is evaluated across six dimensions of financial performance, three taken from the income statement and three from the balance sheet. Thirteen companies that hired a SO during the study period were identified.

Firm performance on each of the six ratios was measured over the three years preceding and following the hiring of a sustainability officer. The thirteen companies hiring a SO officer were ranked on each of the six ratios.

The evidence supports the hiring of sustainability officers by firms performing poorly because SO employment helps underperforming firms generate

relatively higher revenue growth rates, relatively improved accounts receivable turnover, and relatively better inventory management.

Findings suggest that the hiring of sustainability officers does not enhance the revenue stream of firms which are already performing well on a given metric. However, the revenue growth rate, gross margin, and operating income improved for the firms in need of help on these measures.

INTRODUCTION

Discussions regarding sustainability are everywhere! Our university has signed a pledge to have a zero carbon footprint within twenty years. In order to train students, courses have been added in the area of sustainability at many universities. Others have been revised to accommodate discussions of sustainability. A case in point is the course taught by the finance professor of the two authors, who will begin teaching a new required MBA course titled Financial Management and Sustainability (emphasis added) beginning in the fall of 2015.

However, the impact of sustainability efforts remains an empirical question. Do firms making sustainability a key priority actually outperform those that do not take up the cause? Does the value of sustainability efforts vary from firm to firm in a systematic fashion? Orlitzky (2011) found mixed results in his meta-analysis study which included studies from a variety of Business fields. In order to shed light on this issue, we studied the performance of firms hiring sustainability officers, which theoretically would give more precedence to

sustainability than others. Six dimensions of firm performance were examined, three from the income statement and three from the balance sheet. Furthermore, we compared the relative importance of the hiring of a sustainability officer at firms doing poorly on a given financial characteristics to companies doing well. Our findings support the hiring of a sustainability officer at corporations performing poorly on a variety of performance fronts.

LITERATURE REVIEW

What is Sustainability?

Sustainability in this general context was originally defined in 1987 by the Brundtland Report, titled Our Common Future, as "development that meets the needs of the present without compromising the ability of future generation to meet their own needs" (p. 8). This definition, however, needs to be put in the business perspective. Dyllick and Hockerts (2002) that corporate sustainability is "meeting the needs of a firm's direct and indirect stakeholders (such as shareholders, employees, clients, pressure groups, communities etc.), without compromising its ability to meet the needs of future stakeholders as well" (p. 131).

Dyllick and Hockerts go on to recognize three key elements of corporate sustainability: economic, ecological and social. It is important that we integrate the economic, ecological and social aspects in a "triple-bottom line." These three dimensions of the "triple-bottom-line" are strongly related among each

other and therefore it is important to consider the effect a change in one may have in another according to Elkington (1997).

It is also very important to integrate the short-term and long-term aspects. Given quarterly reporting requirements and the shareholder expectation of quarterly dividends, managers tend to be more focused on short-term gains rather than long- term success. A short-term focus is not in accordance with the definition of sustainability. Additionally, the benefits of sustainability efforts may not be realized in the short term.

Why is Sustainability an issue?

There are several reasons why a corporation should be interested in being sustainable. The interest could be simply because it's the right thing to do. The presence of altruistic stakeholders can also ignite the interest of sustainability. Also, the desire to keep up with the competition can trigger sustainability-oriented efforts. These reasons can be characterized in terms of waves of sustainability as proposed by Dunphy, Griffiths, and Benn (2007).

According to Dunphy et al. (2007), the first wave includes the phases of opposition and ignorance. In this self-centered phase, environmental resources are seen as free goods and the main focus is on the economic benefit of the corporation. The second wave is composed of the compliance, efficiency, and strategic proactivity phases. The interest of corporations in the compliance phase is based on avoiding sanctions and maintaining a good citizen image.

Companies in the efficiency phase see environmental management as a way of reducing cost. In the process, they seek to improve efficiency through HR systems. The main focus for those in the strategic proactive phase is innovation. They seek innovation in goods and services produced as well as production processes, including engagement of stakeholders, especially the employees. The third and final wave is composed of the transformational phase. In this phase the sustaining corporation "reinterprets the nature of the corporation as an integral self-renewing element of the whole society and in its ecological contexts" (p.17).

Ernst and Young (2012) proposes that the popular aims for pursuing corporate sustainability are: energy cost reduction, customer demand enhancement, brand risk shrinkage, stakeholder response expectations and competitive threat response. More detailed information is given by Rusinko (2007). His findings show that different types of environmentally sustainable manufacturing practices, such as pollution prevention and product stewardship, are associated with specific competitive outcomes, namely reduced manufacturing cost and improved quality.

A recent study by Ghani, Sharma, and Stagliano (2013) studied the impact that hiring of a sustainability officer has on share prices. They found a significantly positive stock market price reaction around the time that the hiring of a sustainability officer was announced. Ghani, Sharma, and Stagliano claim the that hiring of these officers are a signal to the market that firms take sustainability seriously. The market reaction is an indication that investors

anticipate that financial benefits will accrue from the sustainability officer hiring. We advance their research by testing whether the anticipations materialized.

What does a Sustainability Officer do?

According the University of Vermont (2014), chief sustainability officers (CSO) are responsible for company sustainability training and operations, coordination of the organization's sustainability strategy and assurance that the company complies with environmental regulations. In addition to enhancing the sustainability component of a company's current practices, CSOs introduce new and improved methods of practicing sustainability. An important requirement for this position is possession of an in-depth understanding of the current state of conservation and sustainable development. A CSO's responsibilities include management of institution energy efficiency, "green" building practices, resource and water conservation, greenhouse gas reduction, regulatory guideline adherence and reporting, and location of government grants to help carry on this activity. Given the wide range of possible duties, it is not surprising that the U.S. Bureau of Labor Statistics (BLS), expects the sustainability officer employment to grow by 5% between 2010 and 2020 (Hamilton, 2012).

How does Sustainability compare to Lean Manufacturing?

We were unable to locate specific information tying together sustainability and financial reports. However, we believe that the economic benefit is similar to that expected from Lean Manufacturing strategy. A study by Bergmiller and

McCright (2009) supports the transcendence to Green manufacturing by leading Lean manufacturers. The studied companies appear to be incorporating considerations of both Lean and Green wastes in their journey towards efficiency. Moreover, Langenwalter (2006) proposes that environmentally sustainable practices are a natural extension of lean operational philosophy and techniques." Furthermore, he claims that some sustainability projects can return their investment within 6-to-12 months. Such a rapid payback would justify investment on a purely short-term economic basis.

Kitchell (2014) puts forth seven ways that lean innovations buttress manufacturing industry sustainability. First, there are fewer product defects. This translates into using fewer material, energy, and space resources. Second is less overproduction, similar to fewer defect, if you do not overproduce you are consuming only the material and energy needed. The third way is by minimizing wasted movement. If the layout of the plant is designed efficiently it will improve the utilization of space, heating/cooling, lighting, and definitely any energy required to move the goods. Closely linked to this one is the fourth way, which is identified as reducing both internal and external transportation. The distribution centers should be located strategically to avoid unnecessary transportation. Kitchell's fifth way is to avoid excessive inventory levels, which is relevant for our research which studies the impact of hiring sustainability officers on the inventory turnover ratio. As with overproduction, having less inventory will improve the utilization of the space and the energy required to run it. The sixth way is by reduced waiting. It is important to design a process

that flows as smoothly as possible to avoid having equipment idle, and wasting energy, while waiting for the next step. Last, but not the least important way that lean manufacturing leads to high levels of sustainability, is through less over-processing. The process as well as the product should be designed in such a way that every step in manufacturing adds value to the product. This also applies to any products that were found defective and need to be reworked.

As we can see, there are many possibilities to benefit economically from lean manufacturing through the elimination of waste. This outcome not only reduces the direct cost of materials but also the energy required to produce and distribute, which translates in conserving resources. Our research reports the impact of engaging in these sustainability practices on success as measured using key financial ratios.

RESEARCH METHOD

Sample

In order to identify the impact of adding a sustainability officer (SO) to the management team, we chose to evaluate the thirteen public companies that hired a Sustainability Officer prior to June 2009. These are the same companies identified by Ghani, Sahrma, and Stagliano (2013) and are presented in Table 1.

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Table 1. First Thirteen Corporations to Hire a Sustainability Officer

Firm	Date	Industry	End-of-study Financial Characteristics: 2012 Revenues ($ Billions)	End-of-study Financial Characteristics: 2012 Assets ($ Billions)
DuPont	6/30/2004	Agricultural Chemicals	$ 33.6	$ 48.5
Dow Chemical	5/16/2007	Diversified Chemicals	$ 60.0	$ 69.0
Genesys S.A.	5/20/2007	Information Technology	$ 0.9	$ 1.2
Owens Corning	6/3/2007	Building Materials	$ 5.3	$ 7.5
Regency Centers	11/1/2007	REIT - Retail	$ 0.5	$ 4.0
Norfolk Southern Corp.	12/13/2007	Railroads	$ 11.1	$ 28.5
Covanta Holding Corp	4/7/2008	Waste Management	$ 1.6	$ 4.4
Albemarle Corporation	8/13/2008	Specialty Chemicals	$ 2.9	$ 3.2
YRC Worldwide Inc.	9/4/2008	Trucking	$ 4.9	$ 2.5
Siemens AG	11/13/2008	Diversified Utilities	$ 97.3	$ 16.7
Flowserve	2/17/2009	Diversified Machinery	$ 4.5	$ 1.2
SAP AG	3/2/2009	Application Software	$ 18.5	$ 30.2
AT&T	5/14/2009	Telecom Services	$ 126.7	$ 270.4

Includes Date of Sustainability Officer Hiring, Industry, and Key Financial Characteristics

Revenue, gross margin, and operating income as a percentage of sales information was taken from their income statements. Accounts receivable management, inventory management, and fixed asset management were taken from the balance sheets of each firm.

In each instance, we independently examined the change in these firm characteristics over the three years prior to SO hiring and three years after SO hiring. The three-year window was chosen as a balance between not capturing the impact of hiring a SO and the impact being washed out by other events outside SO control. Specifically, we believed that using a shorter window would not fairly reflect the impact of efforts put forth by the SO. While extending the window further would include a host of factors that could mitigate the value of hiring a SO. The pre-hiring window for I.E. DuPont de Nemours, runs from 2000 to 2003, which is prior to the May 2004 SO hiring exhibited on the first row of Table 1. The last window runs from 2009 to 2012 for Flowserve, SAP AG, and AT&T, which hired SOs in 2009 as shown in the last three rows of Table 1.

The sample comes from a listing of companies hiring a SO completed by Ghani, Sharma, and Stagliano (2013). DuPont is the first firm that they identify as hiring a SO, which occurred in 2004. By comparing the "Date" column information in the first two rows of Table 1, one can note that it took approximately three years for another firm to hire a SO. Ironically, the hiring occurred at one of DuPont's primary competitors, Dow Chemical. Thereafter, we see a wide array of industries represented among SO hiring firms. The third company hiring a SO, Genesys is in the medical technology industry. The four other technology companies (i.e., Siemens, Flowserve, SAP, and AT&T), provide electrical equipment or software. Two SO-hiring companies are in the ground transportation industry, with Norfolk Southern having a railroad

presence while YRC Worldwide is best known for the orange-trailered, "Yellow" and "Roadway" semis seen on roadways. Two companies from different sectors of the housing market are included, with Owens Illinois tied to housing construction and Regency Centers tied to the housing of tourist. Finally, Albemarle and Covanta Holdings manufacture large industrial products. In summary, although the sample is small, a variety of firms have been included in the sample.

Financial information relevant to this research project is exhibited in the two "End-of-study Financial Characteristics" columns. Data is from the annual reports distributed in 2012, the last year of the study. Revenues reported on the income statement ranged from $126.7 billion (AT&T) and $97.3 billion (Siemans AG) to Genesys ($0.9 billion) and Regency Centers ($0.5 billion). Total assets reported on the balance sheet ranged from $270.4 billion (AT&T) and $69 billion (Dow Chemical) to $1.2 billion at Genesys and Flowserve. Evidentally, SOs can be found at firms with a range of income and asset sizes. Consequently, the findings reported here will be applicable in a wide range of business circumstances.

Method of Analysis

Firm performance on each of the six ratios was measured over the three years preceding and following the hiring of a sustainability officer. The thirteen companies hiring a SO officer were ranked on each of the six ratios. Three firms with the highest ratios were identified and formed a portfolio. A portfolio

was also created that consisted of the three firms doing the worst. We then examined the performance of the firms in these portfolios over the subsequent three-year period.

Given the minimum size of each portfolio, and hence the enormous potential impact of outliers, we computed the median change in each ratio for both portfolios. We also computed the standard deviation of the median changes, and identified the most positive change and most negative change. Finally, we identified whether the change was significantly different from zero, which would be a measure of absolute performance, and whether the median changes were significantly different from each other, using t-statistic p values, a measure of relative performance. Stated another way, we investigated the potential for firms already performing well on a given financial measure of performance to enhance this success. At the other extreme, were firms doing poorly able to improve? Alternatively, the latter comparison investigates the potential of firms that were historically successful to increase their competitive advantage, or did poorly performing companies close the gap?

FINDINGS

Income Statement Measures

Akin to Ghani, Sharma, and Stagliano's (2013) finding that investors push up the share price of firms hiring a sustainability officer (SO), such announcements are also likely to be well-received by customers. Hence, hiring firms are likely to see revenues grow. Despite hiring a sustainability officer, firms with good revenue growth rates, gross profit margins, and operating incomes still

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experience a loss in these measures of profitability over the following three years, as shown by the negative values in the top row in the first column of each panel in Table 2. As exhibited in Panel A, median revenue growth fell by 35.4 percent for the firms with the highest revenue growth rates over the prior three years. While one firm experienced a 14.3 percent growth rate increase, another experienced a 43.2 percent decline. Scanning over to the first, "Versus Zero," column of the "statistical significance" set, we see that the median revenue growth rate drop was statistically significant at the 0.01 level.

Table 2. Impact of Hiring a Sustainability Director: Income Statement Measures

Portfolio	Median Change	Standard Deviation	Most Positive Change	Most Negative Change	Statistical Significance: Versus Zero	Statistical Significance: Across Groups
Panel A: Average Three-year Revenue Growth Rate prior to and following hiring date						
Best Firms	-35.4	14.3	14.3	-43.2	0.01**	0.03*
Worst Firms	2.3	24.6	43.5	-0.4	0.17	
Panel B: Average Gross Margin over 3-year periods prior and following hiring date						
Best Firms	-0.6	3.4	2.4	-4.1	0.37	0.30
Worst Firms	1.1	4.8	6.1	-3.5	0.34	
Panel C: Average Operating Income as a percentage of sales over 3-year periods prior to and following hiring date						
Best Firms	-45.3	85.9	-6.2	-170.7	0.10	0.07
Worst Firms	16.9	132.2	243.2	11.7	0.15	

Comparison of a portfolio of firms with the highest ratios on each measure versus the three firms with the lowest measure over the prior three years
All values are in percentage terms, except for p values which are presented in traditional ratio format.

The three firms with the worst prior median revenue growth rates experienced a 2.3 percent rise in this metric over the three years following the sustainability officer hiring. One firm experienced a 43.5 percent change, while another saw a 0.4 percent decline. Given the wide disparity across individual firms, the standard deviation is relatively high, both in absolute terms and relative to the standard deviation of the best three firms hiring a sustainability officer. Although the revenue growth rate is insignificant, it was no longer dropping as it had done over the prior three years. If comparison is made across the groups, one can say with ninety-five percent confidence that there was a narrowing in the revenue growth rate.

Despite discouraging results when it comes to revenue growth, one might expect a sustainability officer to have a greater impact on expenditures, resulting in improvement in profit margins. Although significance does not appear in the other two income statement measures, the same pattern persisted. Despite hiring a sustainability officer, the best firms experienced a decline in gross margins (exhibited in Panel B) and operating margins (exhibited in Panel C). By contrast, firms with low levels in these measures experienced an increase in performance after a SO is hired, as shown by the positive values in the second row in the first column of these panels in Table 2. Relatively little variation occurred in the gross margin category, with the best first firms in the prior three years experiencing a decline of 0.6 percent, and the worst prior firms

experiencing an increase of 1.1 percent. These post-SO hiring changes were insignificant, indicating limited impact on gross margin.

Differences in median operating margins (revenues less all expenses, except for interest and taxes) were almost significant. After SO hiring, firms that had been doing very well experienced a reversal of fortunes, with the median dropping 45.3 percent. The negative 6.2 percent in the most positive change column indicates that all three firms experienced a decline in their operating margins. The negative 170.7 percent value in the most negative change column indicates that for one firm the operating margin loss was 1.7 times the prior operating margin. Although every value is negative, the difference was insignificant due to the variation in the size of the declines.

The three firms with the worst prior operating incomes experienced a median increase of 16.9 percent, the best being an increase of 243.2 percent and the worst being an increase of only 11.7 percent. Again due to the variation, the operating margin improvement is insignificant. The difference in performance is significant at the 0.07 level, reported in the right column of Table 2, only 0.02 shy of the 0.05 level required for a finding to be considered statistically significant.

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Measures of Managerial Efficiency

Table 3. Impact of Hiring a Sustainability Director: Efficiency Ratios

Portfolio	Median Change	Standard Deviation	Most Positive Change	Most Negative Change	Statistical Significance	
					Versus Zero	Across Groups
Panel A: Accounts receivable turnover						
Best Firms	-4.6	-1.6	-2.6	-5.7	0.00**	0.00**
Worst Firms	0.5	1.4	2.7	0.2	0.12	
Panel B: Inventory turnover						
Best Firms	-3.2	0.5	-2.6	-3.5	0.00**	0.00**
Worst Firms	-0.2	0.5	0.3	-0.8	0.24	
Panel C: Fixed asset turnover						
Best Firms	-0.6	16.0	1.2	-27.3	0.19	0.22
Worst Firms	0.0	0.11	0.2	-0.0	0.26	

Comparison of a portfolio of three firms with the highest ratios on each measure versus those with the lowest measure over the prior three years

All values are in percentage terms, except for p values which are presented in traditional ratio format.

**, * indicate the return distribution is significantly different from zero or across groups at the 0.01 and 0.05 percent level, respectively.

The first and second row, respectively, of Panel A in Table 3 represent the changes in the median accounts receivable turnover ratios (i. e., sales divided by accounts receivable) for the top three firms and worst three firms prior to

sustainability officer hiring. Contrary to a preferable increase in the accounts receivable turnover ratio, the three firms with the best accounts receivable turnover ratio experience a decline, with accounts receivable balances rising from 2.6 times sales to 5.7 times sales. With a relative low standard deviation, the median drop of 4.6 percent is significant at the 0.01 level. Meanwhile, firms with the lowest accounts receivable turnover ratio experienced an increase in value, ranging from 0.2 to 2.7. Though not significant independently, the difference between the accounts receivable turnover ratio of the best and worst firms narrowed to an extent that is significant at the 0.01 level.

As with accounts receivable turnover, a higher inventory turnover ratio (i.e., sales divided by inventory) is preferable. Unfortunately, inventory turnover ratios declined for both portfolios following sustainability officer hiring. However, the difference was not significant for the firms with the lowest inventory turnover ratios prior to hiring. In fact, one firm experienced an inventory turnover increase. By comparison, all three firms with the highest inventory turnover experienced a drop over the next three years; a difference which was significant at the 0.01 level. The limited decline in inventory management ratios among the firms which were doing poorly prior to hiring is significantly different at the 0.01 level, from the larger drop experienced by firms which were previously doing well.

Higher fixed asset turnovers (i.e., sales divided by fixed assets) are preferable. There is a wide range in fixed asset turnover following SO hiring on the part of

both the best firms and the worst firms on this performance metric. At least one firm in each portfolio experienced a better fixed asset turnover ratio, while at least one did worse. Consequently, an insignificant change in fixed asset management arose from sustainability office hiring, on either an absolute basis or relative basis.

CONCLUSION

With increased interest in firm sustainability, the position of sustainability officer came into use with the first one hired by DuPont in 2004. Inclusion of a sustainability concern might improve sales and minimize expense, through improved management of accounts receivable, inventory, and fixed assets. This research looks at the absolute benefit of hiring a sustainability officer and the relative benefit based upon whether the firm was doing well or poorly, on a given metric, prior to the hiring.

Findings suggest that the hiring of sustainability officers does not enhance the revenue stream of firms which are already performing well on a given metric. However, the revenue growth rate, gross margin, and operating income improved for the firms in need of help on these measures. Though not significant different from zero, there is a vast relative improvement when it comes to revenue growth rates, which are statistically significant. The minimum operating income ratio, as a percentage of sales, rises by 11.7 percent.

Hiring a sustainability officer improved the relative performance of firms which had low accounts receivable turnover and inventory turnover performance measures in prior years. The most significant improvement occurred when it came to accounts receivable turnover where every firm with high accounts receivable turnover dropped and every firm with low accounts receivable turnover rose. Additional insight is likely to be gained through future research examining the relative performance of firms hiring sustainability officers over different market conditions, intervals, and measures of firm performance.

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Impact of Social Entrepreneurial Innovation on Sustainable Development: The Study of GOONJ- Clothing as a Matter of Concern

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ABSTRACT

Recent literature addresses the issue of social entrepreneurship, social innovation and sustainable development which harnesses the energy of a new kind of capitalism to find solutions for human needs. The purpose of this paper was to extend existing research on the linkages between social entrepreneurship; social innovation and sustainable development. We used an inductive approach and adopt case study research (single embedded case) to study GOONJ NGO. The analysis brings three patterns-role model leadership, creative outcomes and multiplier effect. Towards the end, it proposed SE-SI-SD framework based on the patterns.

1. INTRODUCTION

Emerging economies are suffering with long lasting impact of industrialization, resource exploitation and environmental damage that cannot be removed easily

(Goodland, 1995). Nevertheless, development in this new century is even more conscious of this impact (Repetto, 1986). The problems are multifarious and the solutions are difficult. Hence, sustainable future can only be achieved with an improved understanding of common concerns and shared responsibilities (Oskamp, 2000). Albeit, corporate world is struggling to serve unmet needs of humanity (Gardetti, 2005; N Dawar & Chattopadhyay, 2002; Hart & Milstein, 1999; Prahalad & Lieberthal, 1998). But sometimes, established companies with philanthropic intent lack local knowledge, resources and capabilities to act in developing and less mature markets.

Meanwhile, umpteen agile and innovative entrepreneurial organisations come up and develop a base for the dynamics of compassionate capitalism (Baumol, 2002). Over the last couple of decade's social movements and organization led by Ashoka Foundation (Bill Drayton), the Skoll Foundation (Jeff Skoll), and Schwab Foundation (Hilde and Klaus Schwab) have begun promoting social entrepreneurship and social innovations towards sustainable development in emerging economies. Social entrepreneurial ventures are outside the profit seeking world and stand as the nexus between business, society and development in emerging economies (S. Sharma, Vredenburg, & Westley, 1994) to bridge institutional voids (Mair & Marti, 2009; Brugmann & Prahalad, 2007; London & Rondinelli, 2003).

In this paper we intend (1) to study the interdependency among independent constructs viz. Social entrepreneurship, social innovation and sustainable

development, and (2) to develop a framework to understand social entrepreneurship, innovations in business models and their contribution in sustainable development of any nation. Thus our work dwells around investigating the question: Other things being constant, how does social innovations multiple the effects of social entrepreneurial efforts to make development sustainable? This "how" question is examined using an inductive, theory-building case study methodology (Eisenhardt, 1989;Eisenhardt & Graebner, 2007).

2. LITERATURE REVIEW

2.1 Social Entrepreneurship

Social entrepreneurship relates to a 'person' (Yunus, 2011). A person who takes an initiative with a social vision, who has an ability to analyse, to envision, to communicate, to empathize, to enthuse, to advocate, to mediate, to enable and to empower (Yunus, 2011; De Leeuw, 1999). He is a path breaker, real world problem solver, visionary and creative with powerful ideas (Bornstein, 2007). The most widely accepted definition is presented in 'How to Change the World; Social Entrepreneurs and the power of new Ideas', where, (Bornstein, 2004), brought stories of leading social entrepreneurs both living and past at one place from India, Africa, Bangladesh and Brazil. According to him social entrepreneurs are transformative forces, wherein, people addresses major problems with new ideas, who relentlessly pursue their vision, who simply does not believe in 'no' answers and who will not give up until their ideas gets accepted. And according to Catford (1998) "Social entrepreneurs combine street

pragmatism with professional skills, visionary insights with pragmatism, an ethical fibre with tactical thrust. They see opportunities where others only see empty buildings, unemployable people and unvalued resources....Radical thinking is what makes social entrepreneurs different from simply 'good' people. They make markets work for people, not the other way around, and gain strength from a wide network of alliances. They can 'boundary-ride' between the various political rhetorics and social paradigms to enthuse all sectors of society".

Social entrepreneurship is a nascent field, however, there is no agreed upon definition (Austin, Stevenson, & Wei-Skillern, 2006). The phenomenon is multifaceted and highly complex. One group of people explains it as alternate funding strategy for not-for-profit initiatives (Austin et al., 2006; Boschee, 1998). Another group talk about cross sector partnership between social sector organizations and commercial businesses who also contribute towards society (Sagawa & Segal, 2000; Waddock, 1988). The third group understand social entrepreneurship as a process of social transformation to alleviate social problems (Alvord, Brown, & Letts, 2004). Sullivan Mort, Weerawardena, & Carnegie (2003) defines social entrepreneurship as "a multidimensional construct involving the expression of entrepreneurial virtuous behaviour to achieve the social mission, a coherent unity of purpose and action in the face of moral complexity, and the ability to recognize social value creating opportunities".

2.2 Social Innovation

The expression of 'creative destruction' means 'identifying new combinations of factor inputs' or 'establishing new production functions' and this can be called as technical innovation (Schumpeter, 1962). This explanation of innovation rarely or marginally elucidates anything about social innovation. However, research is social sciences focuses primarily on social innovation. Yet, there is no agreed upon definition. But Mulgan (2006) referred "social innovation to innovative activities and services that are motivated by the goal of meeting a social need and that are predominantly diffused through organizations whose primary purposes are social". He conducted a study at Young Foundation and it was about old and new methods for mobilizing the ubiquitous intelligence that exists in any society in general and developing nations in particular.

Phills, Deiglmeier, & Miller (2008) also defined social innovation as "A novel solution to a social problem that is more effective, efficient, sustainable, or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals". Hence, anything which brings new product/ service, new production, development and distribution, new labor supply and new organizational structure with a social vision in hand can be termed as social innovation.

2.3 Sustainable Development

The discussion on sustainable development starts with "Our Common Future" (1987), the WCED-report and the conference of the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, 1992. The

definition "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" in WCED report (1997) is then adopted by many researcher and practitioners (Dryzek, 1997). In 2005 WCED report described the scope of sustainable development in terms of the three interdependent and mutually reinforcing pillars viz. as social development, environmental protection and economic development, and. And this understand is resembles to the concept of 'triple bottom line' i.e. people, planet and profit (Elkington, 1994).

2.4 Social Entrepreneurship and Social Innovation

A number of researchers emphasize the role of innovation in a social entrepreneurial organization(Borins, 2000). Prabhu (1999) and Mort et al. (2003) identify the three factors of innovativeness, proactiveness and risk taking. Babu & Pinstrup-Andersen (2007) identified the linkage between Social Innovation and Social Entrepreneurship for developing capacities to reduce poverty and hunger in developing economies.

Similarly, Leadbeater (2007) viewed on the relationship between social enterprise and social innovation for ten years in developing nations. He considered powerful models for reform of the welfare state, and in the longer term can create and invest social capital as it is the long-term relationships, trust and ethic of co-operation which provide the basis for innovation necessary for social as well as economic development ultimately leads to sustainable development. Catford (1998) strongly emphasized on the presence of a network

of Social Innovation Centers at regional level, which would act as pilots for new ideas. Alvord et al., (2004) studied on seven cases of successful social entrepreneurs on the basis of core innovations, leadership, organization and scaling up who succeeded in creating social and economic development in a poor country context. Weerawardena & Mort (2006) conceptualized social entrepreneurship as a multidimensional model involving the three dimensions: innovativeness, proactiveness, and risk management. And developed constrained optimal model which can be stated as SVC =f (I, P, RM) subject to S; SM; E where SVC: social value creation; I: innovativeness; P: proactiveness; RM: risk management; S: sustainability; SM: social mission; E: environment.

In strategic perspective, social entrepreneurial ventures can adopt any business model out of symbiotic, complementary or integrated model with limited resources in developing nations (Seelos & Mair, 2007). Hence, business models of these ventures generally have common patterns in their value chain (Konczal, 1975; Selz, 1999; Amit & Zott, 2000; Venkatraman & Henderson, 1998; Hamel, 2000; Magretta, 2002; Teece, 2010).

Social innovation driven business model (Winter & Szulanski, 2001) positively affects entrepreneurial behaviour by developing a role model leadership (Fiol, Harris, & House, 1999) by unique products/ services, new production, distribution network, new labour supply and/ or new organizational structure (Roper & Cheney, 2005). The more acute the social challenge, the greater need for an innovation-driven societal transformation in emerging economies.

2.5 Social Innovation and Sustainable Development

Earlier studies, conducted by various scholars, have established the close relationship among Social Innovations and Sustainable Development. Unilever's Group Chief Executive, Cescau (2007) in CSR report has said that Social Innovation and Sustainable Development are drivers of business growth and they are beyond Corporate Responsibility. Report of a workshop sponsored by the LEAD International, London on 'Invention and Innovation for Sustainable Development', proposed that sustainable development is the practice of protecting the environment and improving standards of living for all, and also, invention and innovation is the key to its success. Social innovations are essential factors for fostering sustainable growth. Invention and innovation for sustainable development isn't just about developing new technology, but includes new processes and new ways of solving old problems—creative thinking is flexible. Hence, it becomes important to identify the nexus between social, environmental and economic sustainability through innovations (A. Sharma, 2010). Here social innovations have multiplier effect on development which can ultimately become sustainable. This impact can also be understood by replication of business models (Aspara, Hietanen, & Tikkanen, 2010) at local, regional and national level. Development tools for achieving vision for an empowered world will fundamentally require ideas and actions in blend of innovation and a strong entrepreneurial approach.

2.6 Social Entrepreneurship and Sustainable Development

Social entrepreneur is an obsessive individual working behind the scene- a person with vision. Drive, integrity of purpose, great persuasive power and remarkable stamina (Bornstein, 2007). Seelos & Mair (2005) identified that how social entrepreneurs enable human, social and economic development which ultimately generates hope for sustainable development in any nation. Social entrepreneurship provides insights that kindle innovative ideas for socially acceptable and sometime also provide sustainable business strategies and organizational forms. As it contributes directly to globally recognized sustainable development goals. Hence, social entrepreneurship may also encourage established corporations to take on greater social responsibility (Seelos & Mair, 2005). In 'Target 3 Billion- PURA: Innovative solutions towards Sustainable Development', Former President of India Kalam (2012) explained that development is the greatest answer to any form of societal unrest and environmental devastation. In Sustainability potential matrix, they explained two parameters to understand competency and value added socio-economic enterprise viz. its economic potential to provide employment & its financial impact on society, at large and its social inclusion and environmental sustainability. Seelos & Mair, (2005) suggested an operational model which describes that for sustainable development, social entrepreneur efficiently supply products and services for basic needs, needs for enabling structures and needs for maximizing choice for individuals and communities/ societies and also for future generations.

2.7 Social Entrepreneurship, Social Innovation and Sustainable Development

Any nation's objective is to achieve its inclusive growth which has to be aligned with its capacities, competencies and development missions (Kalam, 2012). Development tools for achieving vision for an empowered world will fundamentally require ideas and actions in blend of innovation and a strong entrepreneurial approach.

Entrepreneurial efforts through social innovation may change the very structures and systems that recreate the circumstances and that development processes need to consider the link between social, economic and environmental development, ultimately leads to sustained development in any nation. The sustainability of a business is achieved through its ability to address real need in an integrated approach respecting people and the environment (Yunus, 2007). Sustainability is a complex, interlinked construct requiring more than simply the ability to address impacts on the physical environment.

Any nation's objective is to achieve its inclusive growth which has to be aligned with its capacities, competencies and development missions (Kalam, 2012). Development tools for achieving vision for an empowered world will fundamentally require ideas and actions in blend of innovation and a strong entrepreneurial approach.

3. METHOD

In this paper, our objective is to build theory, thus we use inductive approach to develop an empirically derived model of social entrepreneurship, social innovation and sustainable development. Literature suggests that qualitative research like exploratory case studies and inductive logic are appropriate approached in a new field of study (Eisenhardt, 1989; Yin, 1994; Lee, 1999). We adopted a single embedded case study to explore the linkage among the constructs. The case understudy is GOONJ, a New Delhi based NGO.

3.1 Intent behind the choosing GOONJ as a Case Study

'GOONJ..a voice, an effort'- social venture devoted to make 'clothing-a matter of concern' became an obvious choice for this paper because of its mass social impact since its foundation in 1999. Mr. Anshu Gupta, GOONJ Founder has been recognized as 'Social Entrepreneur of the Year' by Schwab Foundation in November 2012, 'Game Changing Innovation' by NASA and US Dept. in July 2012 and GDN Japanese 'Most Innovative Development Project Award' in June, 2012. These awards give an indication that innovations brought by Anshu are creating an impact on larger masses. The story behind foundation of GOONJ is thought provoking.

3.2 Data Sources and collection

Primary Sources of data are based on observation during our visit at GOONJ's office and in-depth semi structured interviews with two employees and three ex-interns conducted online.

We visited GOONJ's head office in Delhi, comprises a brief meeting of half hour with Mr. Anshu Gupta and an entire day tour of 'Processing Center' where employees, volunteers and interns were engaged in variety of recycling activities at various dedicated sub-units and sections viz. sorting unit, washing section, drying section, sanitary napkin unit, school material unit, toy sorting unit, stitching section and quality check section.

The interviews with 3 interns and 2 employees were conducted online after 'Social Entrepreneur of the Year-2012' award ceremony in the month of November. The focus of interviews was on to understand new organizational structure of GOONJ and new forms of dedicated labor supply, which managed and controlled by the founder. Interviews with employees were conducted to develop insights about new products, the value chain and unique distribution system, the collection and processing center of GOONJ. Secondary data sources are GOONJ's website www.goonj.org, all newspaper and published magazine articles, newsletters and videos. Also the publications and archives from Schwab Foundation for Social Entrepreneurship, Kauffman Foundation for Entrepreneurship, Stanford Social Innovation Review, International Institute for Sustainable Development are taken.

3.3 Data Analysis

Primary data through interviews and secondary data were analysed using QSR NVivo 10 software. Nvivo is the most used computer assisted qualitative dada

analysis software which works with complex data, for instance data from interviews, and perform deeper level analysis.

4. CASE ANALYSIS AND FINDINGS

We examine the linkages among the constructs viz. social entrepreneurship, social innovation and sustainable development. The organization of data is presented in the same order after coding of data. We found three patterns in the case and were labelled. These are as follows:

4.1 Role Model Leadership

We found a theme in the interviews and other data source and we called it 'role model leadership'. We performed a key word search that reflected entrepreneur's proactiveness to understand the social need through a couple of triggering events. It also reflected the attributed of a leader viz. visionary, determined, dedicated, enthuse motivation, build trust and respect towards employees, volunteers and interns.

Anshu realized that clothing part has been ignored until a disaster like earthquake (people die due to shake) and tsunami (people die due to water) happens. Anshu also realized that winter is also a disaster because people die not due to winter but due to lack of clothing (as for a poor person clothing is shelter). Here, Anshu says: Also at disaster people do not need cloths because clothing is something which you can store, you can wear one at a time- a disaster takes away – the storage capacity.

The next triggering event, during his journalism days, when he was roaming in the streets of Delhi in search of a story, he met Habib, who was a disposer of unclaimed abandoned dead bodies from the roads. For each dead body he was paid Rs. 20 (Half a dollar). Habib said, in summers he picks up average 3-4 dead bodies but in winters his work goes up and he picks average 10-12 dead bodies in the range of 3-4 kilometers. Anshu's remarks: ..when you talk about development issues, you have some hundred-hundred fifty issues ranging from domestic violence to global warming, you will never find clothing as a subject.

Another one of the basic ignored need of sanitary napkin was touched upon by GOONJ in 2002. GOONJ team started travelling across the country and they found out that during menstruation women use the dirtiest available piece of cloth, they wash it and which are not dried in sunlight because of hesitation, in fact washing itself is a problem as entire village population is dependent on hand pump in a public place, sometimes women wear it again with moisture. The team found that if there are 2-3 women in a family, their cycles are different; they share the same piece of cloth. The team also found that women are using absorbents like ash, husk, sake, jute bags, dry leaves, and dry grass even plastic sheets. And team was shocked discover many other unsafe and unhygienic practices are being adopted by women in several part of the country which led to removal of uterus or even death.

Anshu was highly moved with the fact that issue of clothing is highly neglected not only in India but also across global development agenda. Anshu reinforce

culture of transparency, trust and respect that thrives on personal relationships with his employees and interns. Nishant (an intern) reflected upon Anshu's leadership style:

A leader is one who leads from front and Anshu Sir is one of them. Whoever is around him feels highly motivated and enthusiast about his work as they know Anshu Sir is personally there to resolve any issues or he is there to help them out. Coming office everyday half an hour early from the office time, driving all the way from Faridabad where he lives to office at Sarita Vihar just to plan the day in advance for his subordinates shows how dedicated and passionate he is about his work or I should call his dream. His energy level is unmatchable and best quality of him is that whenever he talks, discuss or explain anything to other person ,he goes to that person's understanding level and explain him things in the way he or she can understand. That's rare and remarkable.

Anshu provides a unique culture which is open, creative, trustworthy and flexible. The stakeholders are invited to share ideas and views. Anshu hold day-long interactive sessions which are called 'Meet the Change'. Wherein, brainstorming sessions are conducted without any agenda which ultimately leads to creative ideas for 'Joy of giving Week'.

Rupinder Kaur adds: I made a Library at processing center of GOONJ for Rural people so that they can easily get the books for their studies. If any camps are going too established in DELHI before that I do all the arrangements for camps

done DOOR TO DOOR CAMPAIGNING FOR THE CAMPS IN DIFFERENT PLACES OF DELHI… Nishant's explanation about participation in GOONJ's activities:

Yes goonj does that. While I was an intern, goonj was planning to collect old newspaper from people across which could help them to prepare packets for sanitary napkins prepared by goonj but knowing the fact that old newspaper generate income and it would be difficult to convince people to donate it, then we were ask to design and create creative campaigns convincing people to donate their old newspaper and the campaign was named "MAKE YOUR LAZY NEWSPAPER WORK". Along with that idea of opening up of stores for goonj's manufactured recycle products to generate income was also discussed which was brought up by me.

Anshu is passionate to about his work. He is highly determined and dedicated towards his vision. When he opened himself to a larger base, he did not provide any leeway to doubt upon his integrity. ..every single person is doing something to make money.. as if money is the only thing on this earth.. I always tell people..you know.. it's all about passion.. your passion might be to have four cars or three bungalows.. my passion might be to provide 'cloths' to people..it's all about passion.

4.2 Creative outcomes

The next pattern evolved after analysis is based on the new organizational structure, workforce requirement, novel means of production and distribution, and new form of services. It also covers the overall reach and scope of the product and services to the end users. We named the pattern as 'creative outcomes'.

The case Goonj, provide a vivid illustrations of new form of organizational structure which provides freedom and flexibility to the employees. GOONJ is a small organization with a flat organizational structure (no hierarchies and rigid rules). It has a five member governing body, 150 employees on full time payroll, also many interns and volunteers at 9 offices cum processing center in 21 states of India. GOONJ has a unique value chain, wherein after collection of cloths done through collection camps and at collection centers, it then goes through processing at processing centers, and further GOONJ matches the need of people and sends the processed cloth to villages. The cloth distribution is not done as 'charity' but as cloth for work i.e. converting age old charitable acts into dignified giving and receiving by taking up developmental activities as per the community requirement like digging wells, cleaning ponds, making roads, bridges and temporary schools. Here, villagers receive cloth instead of money, hence, cloth become the currency paid for developmental activities. This is done under 'Vastra-Samman' program.

GOONJ also focused on the need of school material. Anshu says:

..whenever we talk about school education..we talk about education policy, infrastructure, student teacher ratio..but we ignore the basic need of school material which hampers the basic education.

Here, GOONJ collect large amount of unused material like books, water bottles, pen/ pencils and also toys. Then they channelize the material to school in its School-to-School program. But again the material is not distributed as 'charity'. There the distribution process is again unique. GOONJ volunteers just observe whether the child is coming on time or not, he takes regular bath or not, very basic etiquette behaviour issue and then these children are rewarded. With this process, other children learn to behave in the same manner. This develops healthy and hygienic practices in school going children. GOONJ experimented with toys and provide them to school authorities. Anshu mentioned a reaction of Anganbari worker: "earlier, kid was not coming, now this kid does not want to go". GOONJ's processing center is also unique. It has various dedicated sub-units and sections viz. sorting unit, washing section, drying section, sanitary napkin unit, school material unit, toy sorting unit, stitching section and quality check section. Every piece of material received is sorted, checked and packaged after repairing. Good but dirty clothes are removed for washing. It uses a color-coded sorting system that can be run by people around India, regardless of their education level. It sorts, grades, sterilizes, matches, repairs, repurposes, and packs contributions based on innumerable details. After magnet test the final products are packed in completely biodegradable paper bags and are stitched and packaged.

In 2002, Goonj open up the most tabooed subject-menstruation hygiene. Anshu explained the concerns: ..a lot of people call it a woman issue but I call it as a human issue.. it is exactly like 'condom' where it is not a man issue, it is a human issue…and unfortunately it is so ignored that across the globe and there is no talk about sanitary pad.. that's what we started talking about sanitary pad.. we said that..it has to become a dialogue..people need to talk about it..they have to come out if the 'taboo' thing..which is so grossly associated with it. Consequently, he offers a simple solution. ..why can't we look at one woman's suit, which is a very traditional and commonly used cloth in India..if you hold it your cupboards.. you are holding 20 sanitary napkins for people. Goonj uses old, torn useless cotton or semi-cotton cloth, recycle them and convert them into cheapest possible sanitary napkins with no rocket science technology/ machine. These napkins are hundred percent biodegradable and does not have any plastic in it. The entire material processed at the processing center in a separate sanitary napkin unit.

Anything which is waste, torn and unused is converted into many products, for example, torn jeans, ties, converted into school bag, conference bags, skipping rope or interwoven audio/ video tape for folder/ bags, unused paper/ newspaper are converted in packing bags/ writing pads etc. Anshu mentions that while working on sanitary napkins, the GOONJ team also found a critical gap of undergarment, hence at processing center GOONJ convert old t-shirts into undergarments.

The distribution of sanitary napkins is followed by an awareness session to young girls and ladies to explain the usage and benefits. They are also told that these napkins can be reused after proper wash and sun drying. This help in tackling major problem which has been largely ignored in villages.

4.3 Multiplier effect

The next pattern we found was related to the impact which Goonj had over the past years on various levels. We labelled it 'multiplier effect'. The main aspects were replicability and scalability of Goonj's business model.

Since its inception, GOONJ has come a long way. In last two years (2010-2012), with an annual budget of Rs. 50 Lakhs GOONJ conducted more than 900 development activities like proper roads, school infrastructure, bridges etc. It channelizes million kilograms of urban waste after processing to villages every year. GOONJ uses 200,000 kg. of unused cloths in income generation activities annually. They also make 2 million sanitary napkins from unused cloth. It distributed more than 200,000 pieces of toys and games to village schools in school to school initiative. Over 2.10 million of pieces of cloth were distributed in GOONJ-Rahat program. GOONJ is working on the creation of parallel economy with urban wastage.

GOONJ is currently working with 250 NGO partners in 21 states of the country. It is in close network with the corporates, grass-root organizations, Ashoka Fellows, the Indian Army and local Panchayats. The partners facilitate collection as well as distribution of materials.

GOONJ have collaborates with Johnson and Johnson and partnership EASYDAY, MORE, Reliance fresh and Star bazaar for the collection of books, toys, clothes and other belongings from urban mothers and young children and had a slogan 'Share the Language of Love'. In 2010, GOONJ collaborated with Whirlpool and had a slogan of 'Ek Jodi Kapda' and the central theme was to get people to contribute by giving and donating their old belongings.

In Anshu's view GOONJ is not an organization. It's an 'idea'; people must talk about this basic issue of clothing. ..people have started replicating it, copying it.. and the moment you consider clothing as a matter of concern and list in developmental agenda.. many more organizations… many more individuals will come to work on it.. and the 'idea' must grow at global level.

This fact has also been substantiated by Ahmed Ashhar (ex-employee):
..Anshu's efforts have multifplier effect, for example.. be Mr. Mamoon in Kolkata, who has himself started the distribution of napkins. The efforts are replicable and reliable, I do have doubts about the sustainability, as the model survives on donations, I have my reservations about its longevity. GOONJ is making serious efforts to sensitize people (donors) about- what to donate. The pamphlets were distributed to all donors at collection centers to make them understand and sensitize about what to donate and what not to donate. He points out: ..people donate what they have…they do not donate what other need.

GOONJ's current revenue is Rs. 60 Lakhs. It does not have any separate fund raising unit/ activities and also does not ask people to make monetary contribution. It's major cash inflows are primarily from donations (Rahat), corporate grants (Whirlpool), innovation awards, membership fees, sale of scraps/ newspapers and sale of material to corporates through exhibitions cum sale.

Also with a constant effort, GOONJ has reduced cost of indigenous process of sanitary napkin manufacturing from .97 paisa each to .60 paisa each.
GOONJ's idea of making-cloth as a matter of concern must reach and spread to each individual, community and country to bridge urban and rural divide in health issues and during disasters.

5. DISCUSSION

The purpose if this paper is to understand the linkage among social entrepreneurship, social innovation and sustainable development. In doing so, we examined that social entrepreneurs provides a valuable model for applying the ingenuity and innovation necessary to fundamentally change developing countries at individual, community and national level. We proposed SE-SI-SD framework presented in this paper (Figure. 1), which elucidates that the social entrepreneurs always come up with new and creative ideas in terms of social innovation (Bornstein, 2007). The patterns evolved were role model leadership, creative outcomes and multiplier effect. Social entrepreneurs depict role model leadership, wherein, they exploit the opportunities, and meticulously evolve a

sustainable system. This stream of people enjoys autonomy and freedom and is highly energetic, motivated and passionate, and consequently, social entrepreneurs create and design new forms of organizational structures and serves as 'role models' and, secondly, creative outcomes in terms of new products/ services through innovative means of distribution, new types of workforces in the form of interns and/ or volunteers. These volunteers/ interns are generally school and college students who are highly motivated by the cause and they are willing to contribute in societal development. Gayathri (an employee) emphasized:

They are of both types: motivated to work with GOONJ and coming to have resume points.. A certain section is totally devoted to GOONJ.. and actually believe in the cause and there is another one which is there just for the stamp. Almost all of the collection centres of GOONJ..are based out of homes of people, they form the backbone of the last mile of the urban operations and therefore essential to GOONJ..

Going by the social entrepreneurship literature, a social entrepreneur with innovative ideas generally questions the status quo, identify. GOONJ case suggests that the idea- clothing as a matter of concern is really novel and is driven by sheer passion of Mr. Anshu Gupta. GOONJ is now also a part of TATA Jagrati Yatra- a journey to enlighten and to spark hidden spirits of youth.

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Their impact has multiplier effect at individual, at community and ultimately, at country level. They open new market and scale up the operations, multiply the resources and demonstrate their tangible effects for governments and the other bodies to replicate. The business model of GOONJ may provide important and novel insights to companies working for Bottom-of-Pyramid to rethink their product/ services, R&D, workforce and distribution strategies so that they can also contribute in sustainable development. Here Nishant adds by saying:

..goonj's idea of clothing as a matter of concern must be adopted by corporate world for quicker development of nation as corporate could provide it a good financial backing with wide reach. As Goonj being the N.G.O has limited resources and has to face various difficulties and issues right from logistic to transportation and money is always the issue.

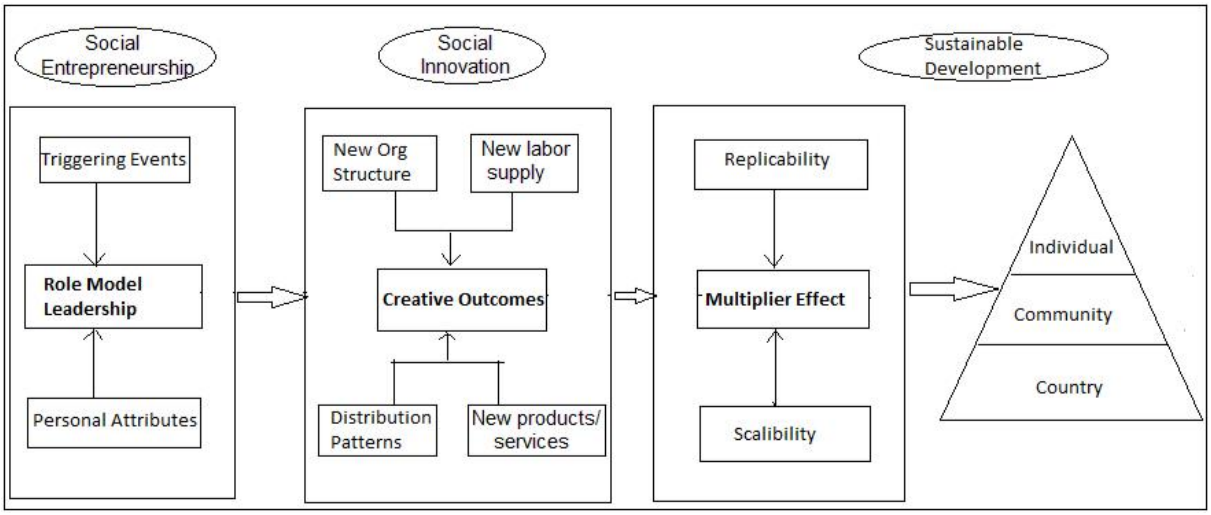

FIGURE 1: A Dynamic SE-SI-SD framework

6. CONCLUSION

GOONJ case elucidates the linkages among social entrepreneurship, social innovation and sustainable development. The framework explicates three patterns viz. role model leadership, creative outcomes and multiplier effect. This work provides an important value-added contribution to make development sustainable. As development is the greatest answer to any form of societal unrest and environmental devastation (Kalam, 2012).

The SE-SI-SD framework (Figure 1) provides promising directions for future research in three ways. First, a multiple case study research can be adopted to understand patterns of social entrepreneurship and the impact on sustainable development to establish generalizibility. Secondly, this theoretical framework can be implemented to study humanity's other most pressing needs viz. education, disability, women empowerment, gender equality, microfinance etc. Finally, an empirical quantitative study can be conducted at individual firm level, community level or at country level to understand both endogenous as well as exogenous factors of the environment.

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Chemistry Entrepreneurship: A Panacea for Job and Wealth Creation

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ABSTRACT

Chemistry is everything and everywhere, as a result chemistry offers wide varieties of business opportunities than any other discipline for entrepreneurial development. Professional chemists including students of chemistry, with little training on entrepreneurial skills could begin to commercialize their innovations to reap enormous financial benefits; become job creators, contribute positively to the national economic development. Chemistry entrepreneurship, a subset of academic entrepreneurship, therefore, involves the process of converting innovations on Chemistry into marketable products for commercial gain. It enables Chemists to take their work beyond publications in academic journals by patenting and commercializing them for economic gains. This paper calls for curriculum re-engineering to fully integrate entrepreneurship into Chemistry curriculum at degree level as well as encouraging researchers to make commercialization a part of their research agenda from the stage of project conceptualization.

1. INTRODUCTION

What is not Chemistry? Can there be a Day without Chemistry? Can Chemist be a billionaire? I am too sure that any person with basic knowledge of chemistry

or science is capable is answering these questions most especially the first two questions based on research experiences in laboratories or interaction with the chemistry or science world. The third question is probably the thrust of this paper. After provision of satisfactory answers to the first two questions, the question then is, how can chemists convert the outcomes of their researches in the laboratories into financial benefits to create more jobs for the chemists or scientists in general in a declining job market in Nigeria to ensure national prosperity through wealth creation?

Chemistry entrepreneurship is a subset of academic entrepreneurship which is in turn a subset of what is referred to as knowledge economy. Academic entrepreneurship has the sole objective of commercialization of innovations developed by academic scientists in universities via patenting, licensing, start-up creation, and university-industry partnerships (Phan and Siengel, 2006; Siengel, Veugelers and Wright, 2007; Rothaermel, Agung and Jiang, 2007). The concept of academic entrepreneurship became prominent in the US especially in the days of decreasing funding of universities during the Reagan Administration (Grimaldi, Kenney, Siegel and Wright, 2011).

Also, government of the US began to think of appropriate policy direction regarding academic entrepreneurship in the late 1970s when the country faced apparent deterioration of national comparative advantage in the manufacturing industry due to increasing competition from the Japanese firms (Coriat and Orsi, 2002; Florida and Kenny, 1990). Policy makers were convinced based on the

huge success of the Silicon Valley that US could improve on its competitive advantage and would compete favorably by introduction of newest science-based technologies developed and that would be developed in the universities while the old technologies will be abandoned (Branscomb and Brooks, 1993). This was the emergence of specific expectations regarding the direct contributions of academic institutions to economic growth with particular attention to local industrial environment (David, 1994) and gradually US universities became part of a societal response to global economic challenges (Grimaldi and von Tunzelmann, 2002).

One major policy that has influenced academic entrepreneurship tremendously in the US is the Bayh-Dole Act of 1980. The Bayh-Dole Act was both an outcome of and response to the changing climate, by enhancing incentives for firms and universities to commercialize university-based technologies (Grimaldi and von Tunzelmann, 2002). The Act instituted a uniform patent policy across federal agencies and removed restrictions on patenting while allowing universities to own the patents arising from federal research grants but stipulated that researchers working on a federal grant are required to disclose their inventions to the technology licensing office (Berman, 2008; Mowery, Nelson, Sampat and Ziedonis, 2004). For example, Yale University sued John Fenn, the winner of the 2002 Nobel prize in Chemistry for compensation because he secretly patented a process that he had developed while being a researcher at Yale University. The judge in the case agreed with Yale University and awarded $1 million to the university (Grimaldi and von Tunzelmann, 2002, Borman,

2005). Evidences are however, abundant in literature that the rise of commercialization associated with the Bayh-Dole Act has not resulted in less basic research (Thursby, Fueller and Thursby, 2009).

The objective of this paper is therefore, is to examine chemistry entrepreneurship within the context of academic entrepreneurship and knowledge economy in general with a view to encouraging researchers in the field of chemistry to commercialize their inventions for financial gains and to motivate students to become chemistry entrepreneurs thereby making them job providers rather than job seekers in the overblown labour market in Nigeria for national economic prosperity.

2. WHAT IS CHEMISTRY?

For conceptual purpose, let us look at an operational definition of Chemistry and how chemistry is used in our daily life which will later form the basis for our call for chemistry entrepreneurship.

Bagley (2014) defined Chemistry is the study of matter, its properties, how and why substances combine or separate to form other substances, and how substances interact with energy. Chemistry can also be defined as a branch of physical science that studies matter in terms of: Composition, Structure, Properties and Transformation/change. Matter is composed of atoms and molecules; chemistry studies the interactions and transformations of matter. Remember, matter is neither created nor destroyed; what we have is

transformation of matter. Chemistry is central to natural sciences as such sometimes referred to as the Central Science.

Understanding basic chemistry concepts is important for almost every profession. There is chemistry in any discipline you can imagine: Biology (Biochemistry); Pharmacy (Pharmaceutical Chemistry); Food (Food Chemistry); Agriculture (Agricultural Chemistry); Plant Science (Phytochemistry); Geology (Geochemistry); Radiology (Radiochemistry); Zoology (Zoochemistry); Astrology (Astrochemistry); etc. to this extent, it is good to know that chemistry is everything and everywhere.

Chemistry can be found in the Kitchen and restaurant/fast food; laundry, beauty salon, garden, swimming pool; hospital; hotel and beer parlor; toilet and bathroom; air; bakery; water corporation; power station; military formations/barracks; photo lab; paint and textile stores; business centres; house roof; inside ship, car, train and aircraft; wastes dump sites; fire station; air; barbing salon; Artist shop; plumbers shop; carpentry workshop; coal pit; quarries; and other areas of human endeavor.

Everything we hear, see, smell, taste, and touch involve chemistry and hearing, seeing, tasting, and touching all involve intricate series of chemical reactions and interactions in our body. With such an enormous range of topics, it is essential to know about chemistry at some level to understand the world around us.

Today, advances in chemistry in the areas of chemical biology, electrochemistry, computational chemistry, synthesis and analytical science, bio & solar fuels, supramolecular chemistry & nanoscience, materials and prosthetics, ageing, nuclear energy, catalysis, supercapacitors, material sciences etc have made life more comfortable.

3. WHAT IS ENTREPRENEURSHIP?

Today, entrepreneurship has become an unavoidable issue especially by policy makers who have seen entrepreneurship as means to addressing increasing rate of unemployment, youth unemployment in particular is worrisome in Nigeria; and so, the concept of is gaining so much ground as a powerful agent for job creation. The concept of entrepreneurship is fast becoming a great phenomenon in the world, being embraced by developed and developing nations alike.

Since entrepreneurship is usually associated with micro, small and medium enterprises, government of nations have used it to promote economic development, MSMEs (micro, small and medium enterprises) being generally accepted as engine of growth most especially in developing economies. Today, the concept of entrepreneurship is gaining so much ground as a powerful agent for job creation.

Entrepreneurship has been defined in many ways by different authors; sometimes the background of the author affects his definition. Richard Cantillon (1755) first defined and wrote on the subjects of entrepreneur and entrepreneurship after which several other authors have written on this subject. Some of these authors include: Joseph Schumpeter (1934) who expressed that the single function which constitutes entrepreneurship is innovation. Ronstadt (1984) gave an all-embracing definition of entrepreneurship "as the dynamic process of creating incremental wealth" while Hisrich (1986) defined: "Entrepreneurship as the process of creating something new with value, by devoting the necessary time and effort, assuming the accompanying financial, psychic, and social risks and receiving the resulting rewards of monetary and personal satisfaction and independence".

Lumpkin and Dess (1996) are of the opinion that entrepreneurship encompasses every step taken by an entrepreneur in entry to a new business and its concomitant problems of new start-ups. According to Covin and Slevin (1989), entrepreneurial style of management is that in which top managers are inclinedto take business risks, are proactive and favor change and innovativeness. Schoof (2006) observed that entrepreneurship is an innovative approach to integrating youths in some countries into the labour markets. Focus is currently zeroed on the contributions of entrepreneurs in the economic growth of several nations, including the advanced nations.

Put simply, entrepreneurship is the process of becoming an entrepreneur. It is a term derived from the word "entrepreneur", it is simply the act of being an entrepreneur. Entrepreneurship involves a process of creating something new with value through innovation with associated financial reward.

It is pertinent to highlight some of the very prominent features of entrepreneurship (Elemo, Oyeku, Adeyemo, Tamasi and Adesegha, 2013):

- Entrepreneurship traits occur naturally or can be developed.
- It is an innovative approach to running a business (small or large).
- It is important for both newly conceived and old businesses.
- It entails dynamism and growth.
- It is driven by opportunity (rather than resources) which is need or market –driven.
- It involves taking risks which are calculated and bearable and would involve evaluation of each situation, risk factors envisaged, strategies to manage or minimize them, etc.

Entrepreneurship serves as a linchpin between invention, innovation, and introduction of new products and services in the market place and also enables the entrepreneurs to act as engine of growth in the economy (Ketchen, 2003; Venkataraman, 1997). Entrepreneurship is therefore, linked to entrepreneurial opportunities, the compelling forces enabling entrepreneurs to introduce or develop new products or services (Inyang and Enuoh, 2009).

Stevenson and Mossi (1986) have argued that a too narrow definition of entrepreneurship may exclude the concept of corporate entrepreneurship whereas a too broad definition could also make it equivalent to good management thus dissolving it as a specialized field of study. With corporate entrepreneurship in mind, Stevenson, Roberts and Grousbeck (1989) defined entrepreneurship as a process by which individuals – either on their own or inside organizations – pursue opportunities without regard to the resources they currently control. This paper therefore, adopts the definition of entrepreneurship as defined by Stevenson, et al (1989).

3.1 Who is an Entrepreneur?

Just like entrepreneurship, scholars define entrepreneurs from different perspectives without agreeing on a particular definition. The term "entrepreneur" is French in origin. To Richard Cantillon (1725), an entrepreneur is one who bears uncertainty, buys labor and material, and sells products at certain prices. Say (1942), considers the entrepreneur as the pivot of the economy and a catalyst for economic change and development whereas Schumpter (1934) sees the entrepreneur as an innovator who does new things in a new way; supplies new products; makes new techniques of production, discovers new markets, and develop new sources of raw materials. Meredith, Nelson and Neck (1991), posits that entrepreneurs are people who has the ability to see and evaluate business opportunities; to gather the necessary resources and to take advantage of them; and to initiate appropriate action to ensure success.

An entrepreneur can also be defined as an individual that generates business idea, convert the idea into product or service, and start a business enterprise based on the business idea with the aim of making profits and assuming risk involved in the management of the enterprise. To this extent, Mr. Aliko Dangote, Mrs. Folorunsho Alakija, Bill Gates, Job Steve (Late), Mike Adenuga, Wale Tinubu are typical examples of entrepreneurs.

According to Kanter (1983), an employee working in an existing organization may also be engaged in entrepreneurial activities through innovation and product development. Such employee is referred to as "intrapreneur". Desire for self independence or autonomy, frustration, dissatisfaction can make such employee to leave the organization he works for and establish a new company to put his ideas into practice; in this case he becomes an entrepreneur (Inyang and Enuoh, 2009).

3.2 Characteristics or Attributes of an Entrepreneur

An entrepreneur requires what is known as entrepreneurial skills to function effectively. These are the needed skills to bring idea from concept to a value creating and profitable firm. Entrepreneurial skill has both technical and management components. Most businesses failed in Nigeria due to business owners possessing high technical component but lacking management component of entrepreneurial skills to run businesses successfully (Elemo, 2013).

It has been generally observed that entrepreneurs posses some exceptional characteristics which differentiate them from the mere business owners. These characteristics include perseverance, hardworking, autonomy, energetic, persuasiveness, flexibility, and so on (Elemo, 2013). Yonekura (1984) in the discussion paper on "Entrepreneurship and Innovative Behaviour of Kawasaki Steel" suggested the following traits or characteristics of an entrepreneur: assertiveness, insistence, forward-looking, critical thinking, creativity, innovation, continuity, preparedness, responsibility, open-mindedness, etc. Also, Burch (1986) mentioned nine salient traits, which are responsible for a high propensity to behave entrepreneurially to include: desire to achieve, hard work, nurturing quality, able to accept responsibility, reward oriented, optimistic, excellence-oriented, an organizer, and money-oriented.

These attributes are grouped into three and presented below.

a. Entrepreneurial Orientation

According to Lumpkin & Dess (1996) entrepreneurial orientation referred to processes, practices, and decision making activities that led to new entry. However, Lumpkin & Dess (1996) conceptualized entrepreneurial orientation to consist of five dimensions of innovation, proactiveness, risk-taking, autonomy and competitive aggressiveness whereas Venkatraman (1989) identified 6 dimensions of strategic (entrepreneurial) orientation: aggressiveness, analysis, defensiveness, futurity, proactiveness, and riskiness.

This paper adopted the Miller's (1983) and Covin and Slevin (1986) three dimensions of entrepreneurial orientation i.e. risk taking, innovation, and proactivness with the assumption that autonomy and competitive aggressiveness are elements of proactiveness and therefore, subsumed in proactiveness dimension.

b. **Entrepreneurial Competency**

Competency has been defined to encompass clusters of skills, knowledge, abilities, and behaviour required for people to succeed (Davis, Naughton, and Rothwell, 2004). Sarwoko, Surachman, Armanu, Hadiwidjojo (2013) defined entrepreneurial competency as the individual characteristics including attitude and behavior, which allow the entrepreneur to achieve business success.

According to Man, Lau and Chan (2002), entrepreneurial competencies are a set of higher-level characteristics involving personality traits, skills and knowledge. They can be viewed as the total ability of the entrepreneur to perform his role successfully. Moreover, Kiggundy (2002) noted that entrepreneurial competency is the sum total of the entrepreneur's requisite attributes for successful and sustainable entrepreneurship, including attitudes, values, beliefs, knowledge, skills, abilities, personality, wisdom, expertise (social, technical, managerial), mindset and behavioral tendencies.

According to Bird (1995), competencies are seen as behavioral and observable but only partly intrapsychic characteristics of an entrepreneur. Consequently,

competencies are changeable and learnable, allowing intervention in terms of the selection, training and development of entrepreneurship. Man et al. (2002), identified six major areas of entrepreneurial competencies in relation to an SME context, including opportunity, relationship, conceptual, organizing, strategic, and commitment competencies. These competencies are supposed to play different roles in affecting an SME's performance with their direct and indirect effects.

Inyang and Enuoh (2009) analyzed nine areas of entrepreneurial competencies which they considered as the missing link to successful entrepreneurship in Nigeria. These are: time management, communication, human resources management, marketing management, business ethics, social responsibility, leadership, decision making and financial management.

c. Entrepreneurial Self Efficacy

Self-efficacy has been defined as entrepreneur's task-specific **self-confidence** (Boyd and Vozikis, 1994; Baron and Markman, 1999; Baum and Locke, 2004) while others in contrast have defined self-efficacy as the ability to master the necessary cognitive, memory processing, and behavioural facilities to deal effectively with the environment (Chen, Greene and Crick, 1998; Segal, Borgia and Schoenfeld, 2002).

Self-efficacy, according to Bandura (1982), is the conviction that one can successfully execute the desired behavior (e.g., successfully launch a business) required to produce an outcome. Self-efficacy also refers to people's judgments

regarding their ability to perform a given activity (Bandura, 1977; Bandura, 1982; Bandura, 1986) and is proposed to influence individual choices, goals, emotional reactions, effort, ability to cope, and persistence (Gist, Stevens & Bavetta, 1991).

In the case of entrepreneurship, entrepreneurial self-efficacy may be comprised of deliberation of those tasks that relate to the initiation and development of new ventures. Campo (2011) defined entrepreneurial self-efficacy as the degree to which one believes that he or she is able to successfully start a new business venture. Segal, Borgia and Schoenfeld (2005) asserted that individual with high entrepreneurial self-efficacy has the tendency to become an entrepreneur later in life. Self-efficacy involves the belief that we can effectively organize and execute certain actions (Bandura, 1997; Chen, Greene, & Crick,1998; Gist & Mitchell, 1992).

It is appropriate to consider the relationship between overconfidence, optimism and entrepreneurial self efficacy. Forbes (2005) suggested that overconfidence measures the accuracy of an individual's ability whereas entrepreneurial self-efficacy measures the individual's perception of their abilities. Forbes (2005) further suggests that an individual's entrepreneurial self-efficacy may vary, with some individuals having over-inflated opinions about their abilities therefore, in such situation, an individual is more likely to demonstrate overconfidence in their abilities. Similarly, experienced entrepreneurs may have a high entrepreneurial self-efficacy based on previous business success that

subsequently leads to greater overconfidence (Douglas & Fitzsimmons, 2005). There are three main categories of overconfidence: 1) overconfidence in knowledge, 2) overconfidence in prediction, and 3) overconfidence in abilities (Hayward, Shepherd and Griffi, 2006).

Parker (2006) argues that certain findings in the psychology literature suggest that entrepreneurs are particularly optimistic.Optimism has also been regarded as a functional characteristic of entrepreneurs, since highly confident individuals are better positioned to start subsequent businesses as they are more likely to cope with high failure rates and to endure the usually tough process leading to new venture success (Hayward, Forster, Sarasvathy and Fredrickson, 2010).

Entrepreneurial experience has been found to inform entrepreneurial optimism of high chances of entrepreneurial success (Lejarraga and Pindard-Lejarraga, 2013). In an empirical study, Ucbasaran, D., Westhead, P., Wright, M., Flores, M. (2010) found that the *nature* of entrepreneurial experience has diverging effects on optimism, such that experiences with business failure were associated with lower optimism as opposed to experiences with business success and this relation was moderated by whether entrepreneurs were sequential or portfolio entrepreneurs.

Oyeku, Oduyoye, Kabouh, Elemo, Karimu, and Akindoju (2014) entrepreneurial self efficacy refers to subjective self belief of an entrepreneur expressed in terms of optimism to start an enterprise and overconfidence to run

it successfully and proposes a modification to the New General Self Efficacy (NGSE) scale to measure entrepreneurial success.

3.3. Entrepreneurship Development in Nigeria

Entrepreneurship development is still at its lowest ebb in Nigeria despite concerted efforts of the Federal government and various entrepreneurship development institutions. One of such laudable efforts is the institutionalization of entrepreneurship development programme in the curriculum of tertiary institutions in Nigeria by the National University Commission, NUC (Unachukwu, 2009).

Ajagu (2005) argued that entrepreneurship is near absent in Nigeria and that the dearth of information in this area has resulted in only few ventured into it without the prerequisite information to succeed while others have to abandon their dreams.

Even though, large awareness has been created for entrepreneurship development, most especially as a way out of the current high rate of unemployment, Nigeria , in 2014 rated 74th in Global Entrepreneurship Development Index with countries like Malaysia (45th), Saudi Arabia (46th), South Africa (51st), Tunisia (61st), Cyprus (52nd), Lebanon (55th) and Namibia (52nd) coming ahead of Nigeria.

However, in the total entrepreneurial activities per country for 2012, Nigeria (35%) came ahead of countries like Denmark (5%), Egypt (8%), Malaysia (7%), France (5%), Germany (5%) and Israel (7%).

The high entrepreneurial activities could not however, translate to better GEDI (Global Entrepreneurship Development Index) rating because our entrepreneurial activities generally lack process innovation, product innovation etc. The way Nigerian entrepreneur cook and sell corn; fry and sell "akara" remain the same for ages without any innovation.

Global Entrepreneurship Development Index (GEDI) is evaluated on 3EAs of: Entrepreneurial Abilities; Entrepreneurial Attitudes and Entrepreneurial Aspiration (GEDI, 2014). The 3EAs are based on 15 main pillars of which opportunity perception, opportunity start up, start up skill, technology absorption, human capital, product innovation and process innovation are chief determinants of Global Entrepreneurship Development Index. These pillars have direct impacts on the level of entrepreneurship development of a country. This explains why countries with high level of technological development have high GEDI ratings.

4. CHEMISTRY ENTREPRENEURSHIP – WHAT IS IT?

It is accepted that Chemistry is everything and Chemistry is everywhere but why are Chemists not getting employed? Ordinarily one will think that Chemists

should be hot cakes in the labor market since they have roles to perform in virtually all areas of human endeavors.

From Chemistry entrepreneurship point of view, Chemists with great ideas, with a little training on entrepreneurship, are supposed to be job creators rather than job seekers. It is however, doubtful if institutions responsible for the training of Chemists in Nigeria have integrated entrepreneurship as an integral aspect of their Chemistry curriculum rather than taking entrepreneurship as a general course even though, a compulsory course. The result of this is that we see students graduating with higher degrees in Chemistry even with commercializable research projects but lack entrepreneurial skills or know-how to convert them into commercial or marketable products with a view to reaping individual financial benefits as well as providing opportunities for national economic development.

Chemistry entrepreneurship therefore, involves the process of converting innovations on Chemistry into marketable products for commercial gain. With increasing awareness in Chemistry entrepreneurship, there is a paradigm shift from conducting basic research whose results end up only in academic journals but today, Chemists and scientists in general are thinking of taking their work beyond publications by patenting and commercializing them for economic gains.

Therefore, achieving transformation of novel science into successful business ventures is key to the long term profitability of the world's chemical and related industries but this goal requires scientists who possess a critical combination of both technical and entrepreneurial skills. This is because activities of commercialization are quite different almost in direct opposite to activities in the laboratories. Increasingly, such individuals are playing a pivotal role in today's knowledge-driven economy by enhancing existing businesses and by setting up new ventures themselves.

Scott P. Lockledge, holds a PhD in Inorganic Chemistry, and a Chief Executive Officer and Cofounder of Tiptek, a company that manufactures of ultrahard and ultrasharp probes for atomic force microscopy applications says that “Founding a company gives you the opportunity to create an enterprise, be it large or small, in which you know you are personally making a difference” and that “working in a large company can feel like being a small gear in a large machine” Lockledge explained further that he was motivated to become an entrepreneur by the desire to control his own destiny. He noted that “when you work for someone else, your boss’s priorities dictate your work-life and lifestyle,” whereas as an entrepreneur, you can decide when and where you work. Lockledge also added that “Inventing and innovating is fun, and the opportunity to do so in a large company setting is increasingly rare.

The Universities, in Brazil and all over the world are currently going through a "second revolution" in which the socio-economical development is incorporated as part of their mission and science and knowledge play a key role for the development of the society.

In promoting chemistry entrepreneurship, the School of Chemistry in conjunction with the Nottingham University Business School, USA is running a programme on M.Sc. Chemistry and Entrepreneurship. The course aims to provide students with an appreciation of the interrelationships between fundamental research and its commercial exploitation while the students will also be able to take advantage of the course´s flexible structure to develop an understanding of specific areas of modern Chemistry and to become fluent in the financial, marketing and managerial aspects of modern business. Another objective of the course is to make students to acquire the technological and business background to enable them to make a significant contribution to today´s chemistry-based, technology-driven economy.

Also, the Department of Chemistry at Case Western Reserve University, Cleveland, Ohio, USA runs the Chemistry Entrepreneurship Program (CEP), a two-year professional M.Sc. in Chemistry Entrepreneurship where the students study state-of-the-art Chemistry, practical business, and technology innovation while working on a real-world entrepreneurial project with an existing company or the student's own startup. The CEP also helps connect students with mentors, advisors, partners, funding sources and job opportunities.

4.1 Chemistry World Entrepreneur Award

In recognition of chemistry entrepreneurship as a discipline, and profession, as well as to promote and encourage Chemistry entrepreneurship, the Royal Society of Chemistry, has instituted an award, i.e. Chemistry World Entrepreneur of the Year. This is an annual award valued a cash prize of £4,000 given to individuals who demonstrated creativity and vision, driving chemistry innovation to commercial success for their businesses.

Professor Paul Workman of the Institute of Cancer Research received the 2012 award based on his work as a scientific pioneer and serial entrepreneur whose numerous commercialized discoveries and academic research led to his founding two successful chemical companies: Piramed Pharma and Chroma Therapeutics

The award for 2013 was received by Professor Chad Mirkin of the Northwestern University, USA based on his scientific and academic achievements involving spherical nucleic acid (SNAT) nanoparticle conjugates while Professor Tom Brown **of** University of Oxford received the 2014 award for pioneering research on nucleic acids which was successfully commercialized. The question is can a Nigerian Chemist, a researcher based in Nigeria receive the next Chemistry Entrepreneur Award? This is pretty possible one day but we need to kick start the process now – Chemistry entrepreneurship!

4.2 Why Chemistry Entrepreneurship?

The following are some of the general reasons for advocating Chemistry entrepreneurship or entrepreneurship in general.

a. The need to tackle unemployment.

Enrolment in tertiary institutions in Nigeria is increasing day-in-day out. The reality is that government and the organized private sectors, do not have enough capacity to absorb the graduates of these institutions. The National Bureau of Statistics put the unemployment rate in the first quarters of 2013 at 23.9% (Odia and Odia, 2013). The situation of unemployment in Nigeria is indeed alarming (Ogunsola, 2009; Aja-Okorie and Adali, 2013). The graduate unemployment problem has generated several other socio-economic problems in the country manifesting in the following: militancy in the Niger Delta, political thuggery among youths, increased rate of armed robbery and kidnapping and even the Boko Haram saga (Ibe, 2012). The most potent way out of this problem is to go technological entrepreneurship to develop a virile MSMEs sector. Table 5 shows the rate of unemployment in five nations of the world between 2003 and 2011.

b. The need to grow the national economy.

The recent rebasing exercise indicated that Nigeria economy is now the 26th largest in the world and the largest in Africa. Recently, Nigeria economy was rated as the third fastest growing in the world. The nation is not far from its

target of attaining the 20th largest economy by 2020 (Nigeria Vision 20: 2020); there is a need to avoid economic retrogression especially in the light of dwindling oil revenue if we must achieve the objective of Vision 20:2020.

c. The need to create wealth to reduce poverty.

Hunger is an indication of poverty. Globally, one in seven people goes to bed hungry everyday (International Food Policy Research Institute, IFPRI). Nigeria ranks 40th among 118 nations on hunger list based on Global Hunger Index (GHI) Ranking computed by IFPRI (2012). This rating is not too good for a nation who is the largest producer of cassava, yam, melon etc.

d. Incessant Civil/social unrest is an indication of poverty.

Most civil/social unrest activities in Nigeria are carried out by people that are not engaged in profitable ventures/enterprises. These have resulted in very poor rating for Nigeria in the Global Peace Index Rating with country rating of 148th out of 162 nations in 2013.

4.3 Things to know in becoming Chemistry Entrepreneurs.

Scientists typically have passion for science, not business; becoming an entrepreneur therefore, requires learning new skills, taking risks and speaking or learning new language or the vocabulary required of an entrepreneur. Scientists also need a basic understanding of the elementary financial structures including basic understanding of balance sheets, cash flow statements, financial ratios and their interpretations and general accounting principles to run business

effectively as well as a working understanding of legal topics such as business structures, contracts, liability, and intellectual property; these involve leaning a new culture.

Judith J. Albers, Cofounder and Managing Partner of Neworks based in New York noted that Scientist who wants to be an entrepreneur must provide answer to the following questions as a way of personal evaluation of their business ideas.

i. Is there a market need?

ii. Do you have solution to the market need?

iii. Does anyone else have the solution?

iv. Can we make serious money here?

v. How close are you going to market?

vi. Do you have a team that can take it to the market?

vii. Do you have a credible business plan?

viii. How much will it cost?

ix. Is this something you really want to do?

x. Is this the right time in your life?

Albers also offers the following suggestions or pieces of advice to scientists who want to become an entrepreneur:

i. Understand the market and where your technology fits.

ii. Be willing to take risk.

iii. Talk to people who have done this before and build support network

iv. Surround yourself with excellent people that you trust.

v. Don't overlook students when you are setting up business teams.

4.4 Steps to take in Starting a New Business

The following are some identified steps to take in starting a new business; the steps are however, not listed in particular order of occurrence (Oyeku, 2008).

- ❖ Make up your mind as to whether you want to be an employer or an employee.
- ❖ Read up materials on entrepreneurship.
- ❖ Do a thorough evaluation of yourself to knowing whether you can be an entrepreneur.
- ❖ Decide on the type of business ownership.
- ❖ Conduct a thorough research into various windows of investment opportunities without necessarily limiting yourself to a particular area.
- ❖ Select two to three out of the various options of investment opportunities.
- ❖ Get investment profiles on the selected options (if available).
- ❖ Narrow down your choice to one option for a start.
- ❖ Conduct a personal research into the industry to becoming knowledgeable in the industry (e.g. competition, raw materials, packaging, machinery and equipment, process technology, etc)
- ❖ Prepare a feasibility report (you can engage a professional but get involved in the preparation).
- ❖ Develop a Business Plan (an extract from your feasibility report).
- ❖ Adopt a name and register your company.
- ❖ Decide on business location.
- ❖ Design your company/product identity package (trade mark/logo, letter headed paper, business card), brochure (information pamphlets), etc.
- ❖ Open a corporate account.
- ❖ Discuss with financial/funding institutions.

- Develop record keeping/accounting procedure.
- Contact suppliers of machinery and equipment, raw materials, packaging materials, electricity, water etc.
- Acquire necessary inputs including building construction/rent/lease.
- Acquire necessary training.
- Recruit labour.
- Locate your market.
- Conduct trial production.
- Register your product (if applicable)
- Open your doors for business.

4.5. Possible Sources of Fund

Balasuriya (2013) enumerated the following windows of opportunities that are available to entrepreneurs to finance their business ideas.

- **Research &Development Grants**: Money used for technology development.
- **Self, family, and friends**: These include personal savings of the researcher and funds from interested family members and friends.
- **Angel investors:** An individual who provides networking help, personal insight, and money to early-stage companies.
- **Venture Capital:** Run by a fund manager to provide investment fund to risky business ideas or projects.

Other sources are: Cooperative Societies; Overdraft or Bank Loans; Hire purchase; Equipment Leasing; Sales of shares and Mortgages.

4.6 Factors militating against Chemistry Entrepreneurship

The factor militating against Chemistry entrepreneurship are the same as those general factors militating against commercialization of R&D results by researchers in Nigeria. Some of these factors as enumerated by Elemo (2014) are presented below:

i. Lack of financial capability by the researcher to develop the innovation to market place.
ii. Weak MSMEs sector to further develop the scientific research findings or innovation in collaboration with the researcher into acceptable products in the market.
iii. Market factor: General apathy for Made-in-Nigeria goods/technologies and high taste of Nigerians for foreign goods including foreign technologies.
iv. Low level of funding of R&D activities in Nigeria.
v. Weak linkage between academia and industry.
vi. Lack of appropriate legal framework on protection and commercialization of innovations.

5 THE WAY FORWARD

To ensure effective technology entrepreneurship, this paper makes the following recommendations as the way forward:

- Researchers should make commercialization part of their research agenda from the stage of project conceptualization.
- Researchers should consider the economic aspects of their research projects at conception and the need for strategic partners who will be involved at every stage of the research work and be ready to commercialize them at completion.
- Researchers/Technology developers in developing nations should go beyond prototype levels and build commercial models in partnership with the private sector.
- Government should not just fund research organizations to carry out researches but also invest heavily and consciously on their commercialization.
- Universities and research institutes should build and operate Science Parks and incubation centres to fast track technology entrepreneurship.
- Universities and research institutes should set up Intellectual Property and Technology Transfer Offices to fast track patenting and commercialization of innovation.
- That research organizations, universities, polytechnics etc should partner with organization such as FIIRO with success story of commercialization and leverage on its commercialization capability and experience for sustainable

economic development through application scientific research results and technology transfer for industrial development.

6 CONCLUSION

Chemistry/technology entrepreneurship is needed to take the nation into the next level of industrialization most especially the attainment of Nigeria Vision 20:2020 and the national Transformation Agenda. Researchers have to be up and doing and be more active in market driven R&D activities that would end up being commercialized.

Even though, Chemistry entrepreneurship is a personal choice of individual Chemist or researcher, I stand to make a clarion call for chemistry entrepreneurship today for the sake of our nation; the economy is nose diving! We probably cannot boast that 20% of our graduates of Chemistry from our various Universities are gainfully employed! This is the time for the nation Nigeria just like it was done in US to turn to the universities and research institutes to bail it out. The onus lies on the universities and research institutes to start devising solutions and workable programs that will take the nation out of economic doldrums.

The nation must begin to take research and development very seriously and imbibe the culture of solving national problems including economic problems using the instrument of science and technology.

The education and the economy of the 21st century must be driven by entrepreneurship. The National Universities Commission of Nigeria is taking the lead in promoting entrepreneurship education in tertiary institutions in Nigeria but the authors of this paper think that we should begin to have specialized universities; research-based, teaching-based and entrepreneurial universities. At this critical state of our economy, what we need is more of entrepreneurial universities and to motivate scientists (academic staff and students inclusive) to move their innovations from the laboratories to the market place through patenting of innovations.

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An Empirical Study on the Influencing Factors of University Students' Entrepreneurial Intention – A Research Based on the Chinese Nascent Social Entrepreneur

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Abstract: A survey approach was adopted and empirical analysis conducted by drawing data from university students who participated in the activities of social entrepreneurship in China. Using descriptive statistics and multivariate regression analysis, this study explores the influencing factors of the formation and development of nascent entrepreneurial intentions of university students. In relation to the university students' entrepreneurial intention, the need for achievement, self-efficacy, and social entrepreneurship orientation are figured out as factors with positive association, while hypotheses concerning locus of control, tolerance of ambiguity, and risk propensity are not supported. Research results help us to understand the attributes of entrepreneurial behavior among university students, and to make further explanations and predictions on the formation and development of nascent entrepreneurs' entrepreneurial intentions.

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Introduction

Social Entrepreneurship, or Social Enterprise, is a business principle associated with both economic benefits and social welfare, which spread quickly globally in recent years. It aims to focus on the needs and social problems which have not been satisfied or solved by the free market system and the government. It enables the organizations to develop and accumulate social welfare though various means of innovation (Dees 2001; Seelos, Mair, Battilana & Dacin 2011). Social Entrepreneurship, indeed, is playing a more crucial role in solving problems, including wealth gap, environmental deterioration and inequality of medical resources under the climate of social transformation (Hechavarria, Renko, & Matthews 2012). Its basic concept is in highly consistent with the sustainable development theory, which is currently the mainstream theory in the world, and it becomes a new focus and a hot academic issue (Hechavarria, Renko & Matthews 2012; Carter, Gartner, Shaver, et al 2003). Thompson (2002) indicated that social entrepreneurship is 'to manage public welfare' through gaining benefit with the business method. Moreover, the operation of a social entrepreneurship organization can be either an enterprise or a non-profit organization (Mair & Marti 2006). ENACTUS, founded in 1975, a non-profit international organization, is a social enterprise dedicated to motivating college students to realize the sustainable development of society, economics and environment through the practice of entrepreneurial spirit. Each year, over 60,000 college students from more than 1,600 schools among 39 countries demonstrate that social entrepreneurship activities with entrepreneurial spirit could generate enormous positive effect for society. Abdu and Johansson (2009)

regarded ENACTUS as the combination of a volunteer organization and a social enterprise. The social entrepreneurship process in ENACTUS could be divided into six steps, including target group (identification), work/life exercises, commercialized enterprise, personal development, social economic development as well as cooperative relationship network. ENACTUS was introduced into China in 2002. Presently, 242 colleges, from different regions, including East China, South China, Hong Kong, Central China, Northeast China and Midwest China, have already formed a college alliance. Over 14,000 Chinese college students from ENACTUS continuously implement long-term social entrepreneurship activities in order to create social value, producing in tremendous community benefits. Social problems mentioned in the ENACTUS projects covered areas such as healthcare, environmental protection, cultural heritage, agricultural development, youth education as well as poverty alleviation. These undergraduates, forming social entrepreneur groups, are becoming social problem solvers through the practice of entrepreneurship with creative methods. Social entrepreneurship, or social enterprise, as a new-type social organization on a global scale, has been developing rapidly, and has gradually developed to become a social force besides government and market, which is proving practically to be effective in coping with the above-mentioned challenges (Sud, VanSandt & Baugous 2009). Social entrepreneurship creates social value by the business concept and means. As a relatively new notion and method, social entrepreneurship draws the attention of practitioners, policy makers and scholars (Alvord, Brown & Letts 2004).

To understand the entrepreneurial behavior of a nascent entrepreneur, whose entrepreneurship is at an early stage, college students' social entrepreneurship group provides proper study scenarios. As this social entrepreneurial model has just started recently in China, existing relevant theories and empirical studies are inadequate to clarify such social entrepreneurial behavior. The difference between this article and previous ones lies in that, this study focuses on the social entrepreneurial model, with which the data are collected from questionnaires done by social entrepreneur college students from 19 cities. Moreover, it is based on empirical research and analysis to indicate the influencing factors of the formation and development of entrepreneurial intentions of college students as nascent entrepreneurs in social entrepreneurial activities.

Theory Summary and Research Assumption

Nascent Entrepreneurs

In the study of entrepreneurs, Ucbasaran, Lockett, Wright, and Westhead (2003) divided entrepreneurs into three kinds. These are nascent entrepreneurs, balanced entrepreneurs and serious entrepreneurs. They indicated that nascent entrepreneurs start their business from scratch, without any experience about entrepreneurship or operating and managing a corporation. Nascent entrepreneurs, or new-born entrepreneurs, also referred to those individuals who are going to prepare for entrepreneurship (Davidsson & Henrekson 2002). Gartner & Shaver (2012) regarded a nascent entrepreneur as a person who is

actively organizing an enterprise, alone or cooperate with others, and wishes to become the owner of this enterprise.

N. F. Krueger （2007）suggested that only with entrepreneurial intention could entrepreneurs really engage in entrepreneurial activities and start new corporations. Entrepreneurial intention has been widely acknowledged in entrepreneurial research and has been used to explain entrepreneurial activities (Krueger 1993; Kolvereid 1996; Krueger 2000; Lee, Wong, Der Foo, et al 2011). The logic lies behind is that the intention can be used to predict personal behavior. Hence, study of intention is an important way to understand behavior (Allinson, Chell, & Hayes 2000). Entrepreneurial intention refers to an entrepreneur's psychological state of intending to start a new business, and it also refers to an entrepreneur's judgment of the possibility of starting a new business by himself (Porter, 1996). Entrepreneurial intention is a psychological state which lead the entrepreneur to throws himself/herself into the well set business objectives and take action to pursue it. Most, Scholl and Clifford (2005) indicated that recognition includes decision, learning, personality and consciousness. And the entrepreneurial intention's formation and development is influenced by various factors. Arenius and Minniti (2005) noted that when setting the economic model of nascent entrepreneurs' behavior, cognitive variables should be considered. Whether nascent entrepreneurs decide to start a business is relevant to four variables. They are alertness to opportunities, fear of failure, opportunity perception and knowing other entrepreneurs. Renko, Kroeck and Bullough (2012) predicted entrepreneurial intention by three variables:

intended effort, amount of startup activities completed and time spent on startup activities. Leonard, Scholl and Beauvais (1997) discovered that perceptual variables, such as vigilance of opportunity, fear of failure and confidence of one's own skills, cast significant impact on the entrepreneurial choice of nascent entrepreneur. Gatewood, Shaver, Powers, et al (2002) investigated the entrepreneurial expectancy and effort-performance linkage through research results from 179 undergraduate business students. Boolos, Burgess and Jeffrey (2002) concluded that it is because entrepreneurs have the characteristics like optimism, sizing up the situation, creativeness and spirit of adventure that make them easier to found a business. Korunka, Frank, Lueger, et al (2003) found that entrepreneurs have three peculiarities through empirical study – these are achievement need, inner source control and risk propensity. Gurol and Atsan (2006) indicated six characteristics (of an entrepreneur) including: need of achievement, locus of control, risk taking propensity, tolerance for ambiguity, innovativeness and self-confidence.

Empirical studies on influencing factors of entrepreneurial intention lead to different results due to different study objects and scenarios. Kristiansen & Indarti (2004) verified influencing factors like self-efficacy, need for achievement, locus of control and entrepreneurial preparation of Indonesian as well as Norwegian undergraduates, and the results showed that individual background, entrepreneurial preparation and entrepreneurial self-efficacy can well explain entrepreneurial intention as influencing factors, while need for achievement and locus of control do not have significant relevance to

entrepreneurial intention. Erkko Autio (2001) analyzed influencing factors of undergraduates' entrepreneurial intention targeting at Finnish, Swedish, American and English students basing on the theory of planned behavior. Through international analysis, it was found that cognitive behavioral control is the most critical determining factors which contribute to the intensity of entrepreneurial intention. While Evan J (2013) hold that self-efficacy and personal attitude will affect the intensity of entrepreneurial intention.

Meyer et al considered that entrepreneurial self-efficacy helps to predict opportunities, which is the significant factor that contributes to entrepreneurial intention (Meyer, Zacharakis, & Castro 1993). Theory of self-efficacy stems from Bandura's core point of view in the Social Cognitive Theory system. Self-efficacy is the personal perception of the ability to finish some jobs. Not only can it affect people's choice, persistence as well as attribution patterns of behavior and but also it can influence people's way of thinking and behavioral efficiency. As a result, self-efficacy, as the attribution of personal behavior in specific scenario, can well explain how entrepreneurial intention is formed and developed (Bandura 1997). Evan. J (2013) proposed that self-efficacy and individual attitude are significantly relevant to entrepreneurial intention. Due to the fact that entrepreneurs usually encounter environments as well as missions of their own specificity, self-efficacy is regarded as an important precondition leading to entrepreneurial intention (Boyd & Vozikis 1994; Krueger 2000). Furthermore, each dimension of self-efficacy has different characteristics at different stages of the entrepreneurial procedure (Kickul, Gundry & Whitcanack

2005). In the exploration of entrepreneurial intention theory study of nascent entrepreneurs' stage, Entrepreneurial Self-Efficacy (ESE) is an important means. It can not only explain how entrepreneurial intention develops but also explain the agent of how intention turns into action (Boyd & Vozikis 1994). Barbosa (2007) reckoned that self-efficacy includes four dimensions, based on the viewpoint from De Noble et al (1999) and Chen et al (1998). These are: 1) Opportunity Identification Efficacy which means an individual is able to identify and develop new products and market; 2) Relationship which means individual has the ability to build up relationships, especially the relationship with potential investors; 3) Self-management, meaning that an individual has management ability, especially economic and financial management ability; and 4) Compressive Resistance, when an individual is confronted with pressure in work, his/her capability of dealing with all kinds of pressure, conflict and change.

(2) Social Entrepreneurship Study

So far, academia's research mainly focuses on commercial entrepreneurship instead of social entrepreneurship. Nowadays, as our country's economics is under rapid transformation, social entrepreneurship is the key to solve various kinds of social problems. Cook, Dodds & Mitchell (2003) and Pomerantz (2003) noted that the key to attain the success of social entrepreneurship is to introduce innovative commercial methods to provide social services. More importantly, based on the foundation that we should set the ultimate target as realizing social or environmental goals through the sustainable operation model, we should

obtain as much profit as possible through adopting the operation model of for-profit organizations. Alter (2007) also thought that social entrepreneurship mainly dedicate to using commercial methods and ways to reach social target, combining the capital and management means of commercial organizations as well as non-profit organizations, creating economic and social value, driven by market while guiding by the mission and integrating commercial statics in the process of achieving mission, etc. American famous expert of management Peter Drucker (2014) indicated that social entrepreneurship changes the capacity of social performance and cast an intensive and profound influence on the society. Social entrepreneurs are defined as the group of people who try to use commercial methods to reach the target of stimulating the society to progress. They are good at applying commercial thought and entrepreneurial spirit to deal with social problems. Five criteria are used to define social entrepreneurs. First one is they can perform a mission that can produce social value continuously instead of personal value. Second one is discover and pursue new chance insistently and take action for this mission. Third one is innovating, adapting and learning continuously. Fourth one is taking action bravely without being constrained by lack of resources. The last one is having strong responsibility of society development and social value creation. Social entrepreneurship is the way non-profit organization by virtue of market mechanism changes its reliance on the outside assistance and intrinsic operation mode. Social enterprise is the combination of multiples. It is the continuum between charities (non-profit organizations) and for-profit organizations (private enterprises).

Undergraduate will be confronted with the question whether to find a job or start a business when they are going to integrate into society. Students who choose to start a business are nascent entrepreneurs. These new-born social entrepreneurs have good education background and relatively strong comprehensive ability. Out of employment pressure, sensitivity to opportunities, and need for self-fulfillment, more undergraduates are joining the nascent entrepreneur group in the early stage of entrepreneurship and they start to form and develop entrepreneurial intentions through social entrepreneurial activities.

(3) The Analysis and Research Assumption of the Influencing Factors of Entrepreneurial intention

Based on both home and abroad researches of influencing factors of entrepreneurial intention, need for achievement, risk taking propensity, locus of control and tolerance for ambiguity affect how entrepreneurial intention is formed and develops. Lee et al (2011) thinks that successful entrepreneurs normally have the following mental traits: achievement motive, locus of control, risk taking propensity, tolerance for ambiguity, self-confidence and innovativeness. Luthje and Franke (2003) did research on MIT students. The result shown that entrepreneurial intention is influenced by outside environment while risk taking propensity as well as locus of control affect entrepreneurial intention by influencing entrepreneurial attitude. Korunka, Frank, Lueger, et al (2003) concluded that entrepreneurs must have three characteristics through empirical studies. They are achievement need, locus of control and risk taking propensity. Guro & Atsan's (2006) study identified six characteristics: need for

achievement, locus of control, risk taking propensity, tolerance for ambiguity, innovativeness and self-confidence.

Need for achievement refers to a motive that individual hopes to achieve success and pursue perfect. McClelland's 1965 Need Achievement theory indicated that when someone has a higher level of achievement expectation of his own future career, that individual with higher need for achievement tends to handle affairs with more strict requirements. McClelland implied that when individuals set up their targets, regarding higher achievement need, people are easier to finish jobs requiring personal effort, more capable of undertaking jobs requiring high responsibility and explicit performance feedback. Hence, individual with higher achievement need has stronger entrepreneurial intention. In Begley and Boyer's empirical study of nascent entrepreneur and non-entrepreneur, they found that achievement need is obviously relevant to entrepreneurial spirit. Based on the above discussion, we put forward following assumption.

Hypothesis 1: Need for achievement is positively relevant to entrepreneurial intention. The stronger the need of achievement, the stronger is entrepreneurial intention. Rotter's (2005) Locus of Control Theory refers to the degree that an individual perceives that his/her reward is contingent upon his/her own behavior and consequences. People with the property of locus of control reckon that success comes from one's own effort instead of luck (Brockhaus 1975). They tend to attribute the results to themselves and pursue the state that they can plan

their own life according to their wish. Shapero (1975) found that entrepreneur are more likely to have higher locus of control compared with normal people. Rotter (1975) thought that entrepreneurs with locus of control are more likely to undertake entrepreneur activities, braver to bear the entrepreneurial risk in order to realize their entrepreneurial ideal. Chen et al (1998) also indicated that students and managers in small- or middle-sized enterprise who have stronger locus of control are more likely to undertake entrepreneurship. Cromie (2000) did a comparing research between the locus of control of entrepreneur and manager. The result shown that the former's locus of control is higher, which implied that locus of control is positively relevant to entrepreneurial spirit. Based on the above discussion, we put forward following assumption.

Hypothesis 2: Locus of control is positively relevant to entrepreneurial intention. The higher locus of control, the stronger is the entrepreneurial intention.

Because many factors that entrepreneurship confronted with are uncertain, most of researches regard risk taking propensity as the significant characteristic of an entrepreneur. In the behavior research of entrepreneur and manager, entrepreneurs are more willing to bear risk, which is regarded as the important characteristic that distinguishes an entrepreneur from others. Faragoa, Kissa, and Borosb (2008) thought that an entrepreneur who is risk taking usually thinks that there is enormous profit space in the environment. Simon (1986) thought

people who are more willing to take risk have stronger entrepreneurial intention. Based on the above discussion, we put forward following assumptions.

Hypothesis 3: Risk taking propensity is positively relevant to entrepreneurial intention. The higher level of risk taking, the stronger entrepreneurial intention is.

Tolerance for ambiguity refers to when an entrepreneur is confronted with an uncertain and new environment, they envisage it rather than escape it. Tolerance for ambiguity is the significant characteristic of entrepreneur. In the uncertain entrepreneurial environment, stronger tolerance for ambiguity is helpful to entrepreneurship. Empirical studies in early researches, discovered that businesses with more transparent information are easier to attract entrepreneurs with tolerance for ambiguity to participate. Begley and Boyd (1987) found that in the level off, entrepreneur scores much higher than non-entrepreneur. Scherer et al (1989) also did small sample empirical studies in entrepreneurs and managers. He found out that people with higher level of tolerance for ambiguity are much easier to generate strong entrepreneurial intention. Based on the above discussion, we put forward the following assumption.

Hypothesis 4: Tolerance of ambiguity is positively relevant to entrepreneurial intention. The higher level of tolerance of ambiguity, the greater entrepreneurial intention is.

Bandura was the first one to put forward self-efficacy definition and he defined it as the psychological trait that an individual believes he/her is able to organize and undertake a mission while believing in he would gain a certain achievement. Jung (2001) did a thorough research in entrepreneurial self-efficacy and the relationship between entrepreneurial intention and action, considering the influence brought by social cultural difference. They did cross-cultural comparative studies between undergraduate and manager in American and Korean business school. They found that in general, entrepreneurial self-efficacy is positively relevant to entrepreneurial intention. Jill (2005) combined core skills that entrepreneurship needs, dividing self-efficacy into opportunity identification efficacy and risk tolerance efficacy, which influence an individual's entrepreneurial intention. Research from Chen et al (1998) and De Noble et al (1999) not only proved that entrepreneur's self-efficacy is more obvious than non-entrepreneur's, but also proved that differences of self-efficacy exist among students from different majors. Students majoring in entrepreneur score much more higher in most of dimensions of entrepreneurial self-efficacy than those who are not majoring in entrepreneur. Based on the above discussion, we put forward the following assumption.

Hypothesis 5: Self-efficacy is positively relevant to entrepreneurial intention. The higher the level of self-efficacy, the stronger the entrepreneurial intention is. In the study of social entrepreneurial theory, social entrepreneurship orientation or social entrepreneur orientation refers to the public benefit body's

mindset, value, personality trait based on a certain concern and sense of altruism, facing specific social group or eyes on problems of human development behavior. It is non-profit, optional, altruistic and social. Individuals or organizations with a social entrepreneurship spirit tend to deal with social problems by various kinds of innovation of commercial models, such as helping more disabled people with unemployment, helping community residents with problems that the government policy cannot cover, providing medical health care, etc. These individuals and organizations prefer adopting an entrepreneurial mindset when deciding on the solution to social problems, possessing stronger entrepreneurial intention. Based on the above discussion, we put forward the following assumption.

Assumption 6: Social entrepreneur's spirit is positively relevant to entrepreneurial intention. The stronger social entrepreneur's spirit, the greater entrepreneurial intention is.

Variables and sample statistics Variable Selection and Measurement

This study selects college students from ENACTUS China, who are nascent social entrepreneurs, as the investigation object. The measurement scale adopts six variables as the explanatory variables for entrepreneurial intention, namely need for achievement, locus of control, risk taking propensity, tolerance for ambiguity, entrepreneurial self-efficacy (ESE) and social entrepreneurship orientation. Meanwhile, it selects the time span of entrepreneurship

participation, role, gender, major and region of a college student as five controlled variables.

The measurement of entrepreneurial intention is specified in six items based on the measurement scales from works of Krueger, Reilly, Carsrud (2000), Delmar and Davidsson (2000), as well as Chen, Greene and Crick (1998). The measurement of need of achievement selects ten items from the measurement scales from works of Yu Anbang and Yang Guoshu (1987).The measurement of locus of control selects seven items from the measurement scales from Faragoa, Kissa, and Borosb (2008). The measurement scale (six items) of entrepreneurial self-efficacy (ESE) is modified based on the measurement scale brought up by Lucas and Cooper (2005). The measurement of risk propensity (five items) and tolerance of ambiguity (four items) refer to the measurement scales from works of Stein and Indarti (2004), as well as Luthje and Franke (2003). The measurement of social entrepreneurship orientation, which is brought by this study, includes 11 items based on the studies from Alter (2007). This study adopts measurement scales from prior studies from abroad as much as possible. In order to evaluate the wording and content of the questionnaire design as well as the measurement items, we also conduct further interviews and pretests towards respondents. The questionnaire is modified based on the responses of interviews and pretests.

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Sample Statistics

Each statement in the measurement scale is classified on a five-point Likert scale, from disagree (1 score) to strongly agree (5 scores). The investigation subjects are college students from ENACTUS China. Samples are chosen from East China (Hangzhou、Ningbo、Suzhou、Shanghai, Nanjing and Dalian), South China (Shantou, Shenzhen and Guangzhou), North China (Tianjin, Beijing, Harbin, Changchun and Shenyang) and Mid-West China (Zhengzhou, Changsha, Wuhan, Xi'an and Chongqing). There are 19 cities in total. The questionnaire contains five controlled variables, namely entrepreneurship participation time span, role, gender, major and region. Major is divided into arts and science. Entrepreneurship participation time span is divided into less than one year and more than one year. Role is divided into innovator and participant. The primary work for an innovator are the startup of new programs, the setup of program teams, conduction of business plan and marketing plan, and the development of products and services. The primary work for a participant concludes market research, market promotion, project operation, fund raising and dealing with partners.

The investigation was carried out in June, 2014. The investigation subjects are project teams from ENACTUS China who enter into entrepreneurship. All paper questionnaires are filled in on the spot. 300 questionnaires were distributed and 265 copies were returned, yielding a response rate of 88.33%. Of the 265 copies, some copies contained with empty items were filled in with the average method.

Therefore, 255 usable questionnaires are obtained, yielding a usable response rate of 85.00%.

1. The Validity and Reliability Examination

The questionnaire items mostly refer to prior studies from scholars; questionnaire statements were also modified on the basis of interviews with relevant professors and questionnaire prediction. Therefore, the questionnaire has a relatively high content validity. Furthermore, the fitting method is adopted for examination, because statistics validity and reliability examination is an important foundation of a well-fitting model. As for the reliability of the measurement scale, we select Cronbach's Alpha Approach for the evaluation of internal consistency. According to Table 1, the values of alpha are all greater than 0.70, therefore the internal consistency of the sample meets the requirement of reliability examination. As for the validity, confirmatory factor analysis method is conducted for examination. According to Table 1, the fit indexes of all latent factors in the confirmatory factor analysis are within the acceptable range of requirement, with their factor loadings all greater than 0.70. Therefore, the measurement scale shows a good convergent validity.

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Variables	Cronbach's Alpha	Items
Entrepreneurial intention	.853	6
Entrepreneurial self-efficacy	.832	6
Social entrepreneurship orientation	.801	11
Locus of control	.862	7
Risk propensity	.817	5
Tolerance of ambiguity	.821	4
Need for achievement	.761	10

Table 1 Reliabilities of Study Variables

Results of Empirical Analysis Descriptive statistical analysis

The study adopts SPSS19.0 to count all effective questionnaires. Entrepreneurs characteristics are classified into gender, major, region, and the time span of social entrepreneurship and role of a college student.

Table 2 shows the descriptive statistics of sample frequencies. Samples are drawn from 19 cities in China; 34.8% of them are developed, and 61.6% of them are underdeveloped. Developed regions contain Hangzhou, Ningbo, Suzhou、 Shanghai, Nanjing and Dalian, which lies in East China; Shantou, Shenzhen and Guangzhou, which lies in South China; two directly governed city regions Tianjin and Beijing, which lies in North China. Underdeveloped regions contain Harbin, Changchun and Shenyang, which are in North China; Zhengzhou, Changsha, Wuhan, Xi'an and Chongqing, which are in Middle-West China. As for the gender of college students engaged in social entrepreneurial activities, it consists of 50.2% male and 49.8% female. As for the major, it consists of 57.3% arts students and 42.7% science students. Arts students have preponderance over science students because they are more familiar with social factors.

As for time span of social entrepreneurship, 49.4% of the students are engaged less than one year and 50.6% of students are engaged more than one year. Students who join ENACTUS are normally in the second or third year of college, so there is only a minority of them engaged more than one year. Roles into entrepreneurship are classified into innovators and participants. 38.8% of the students are innovators and 61.2% of them are participants. There are only a minority of them are innovators because the work of an innovator require significant period of time of social entrepreneurial experience. For example, work as the startup of new programs, the setup of program teams, conduction of

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business plan and marketing plan, and the development of products and services,

Entrepreneurs Characteristics	Classification	Samples	Percentage (%)
Gender	Male 0	128	50.2
	Female 1	127	49.8
Major	Arts 0	146	57.3
	Science 1	109	42.7
Time span of social entrepreneurship	Within one year 0	126	49.4
	Above one year 1	129	50.6
Role	Participant 0	156	61.2
	Innovator 1	99	38.8
Region	Developed 0	98	38.4
	Underdeveloped 1	157	61.6

Note. Developed regions contain East China and South China; underdeveloped regions contain North China and Mid-west China.

Table 2 Descriptive Statistics of Sample Frequencies (n=255) Multivariate Regression Analysis

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Which factor can remarkably affect entrepreneurial intention? This study chooses entrepreneurial intention as the dependent variable, and chooses need for achievement, locus of control, risk propensity, tolerance of ambiguity, entrepreneurial self-efficacy and social entrepreneurship orientation as six explanatory variables. Moreover, it selects gender, major, time span of entrepreneurship engagement, role and region as five controlled variables. Table 3 shows the results of multivariate regression analysis.

	Explained variable：entrepreneurial intention				
Variable	Standardized regression coefficient	t-value	F-value	R^2	Modified R^2
Need for achievement	0.165	2.649***	13.804***	0.386	0.358
Locus of control	0.071	1.290			
Risk propensity	0.056	0.884			
Tolerance of ambiguity	0.060	1.043			
Entrepreneurial self-efficacy	0.268	4.855***			
Social entrepreneurship orientation	0.347	5.527***			

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Gender	-0.042	-0.710			
Major	0.031	0.593			
Time span of entrepreneurship engagement	0.160	2.762***			
Role	0.010	0.185			
Region	-0.181	-3.373***			

Note. n=225,* P<0 .1, ** P<0 .05, ** P<0 .01, significant level of relevance (Bilateral)

Table 3 Results of multivariate regression analysus

As is evident in Table 3, the total model shows a high level of significance, ($F=13.804$, $P<0.01$), R^2 equals 0.386, which suggests that the model can explain entrepreneurial intention in a degree of 38.6%. Moreover, need of achievement, entrepreneurial self-efficacy and social entrepreneurship orientation show a notable positive relationship with the entrepreneurial intentions. Their regression coefficient are 0.165 ($P<0.01$), 0.268 ($P<0.01$), 0.347 ($P<0.01$), accordingly. However, the locus of control, the risk propensity and the tolerance for ambiguity don't show a significant positive relationship with entrepreneurial intentions. So far, only hypotheses 1, hypotheses 5 and hypotheses 6 are verified in this study. Plus, among all controlled variables, only time span of entrepreneurship engagement and region are relative to entrepreneurial intentions. Their regression coefficients are 0.160 ($P<0.01$) and -0.181 ($P<0.01$), accordingly.

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Hypothesis	Supported or not supported
H1 : The stronger the need of achievement, the stronger are entrepreneurial intentions	Supported
H2 : The stronger the locus of control, the stronger are entrepreneurial intentions	Not supported
H3 : The stronger the risk propensity, the stronger are entrepreneurial intentions	Not supported
H4 : The stronger the tolerance for ambiguity, the stronger are entrepreneurial intentions	Not supported
H5 : The stronger the entrepreneurial self-efficacy, the stronger are entrepreneurial intentions	Supported
H6 : The stronger the social entrepreneurship orientation, the stronger are entrepreneurial intentions	Supported

Table 4 Summary of Hypotheses and Results

Conclusions

Kristiansen and Indarti (2004) identified determinants of entrepreneurial intention among Indonesian and Norwegian students, for example, entrepreneurship preparation, entrepreneurial self-efficacy, need of achievement and locus of control, etc. The results of the research show that individual background, entrepreneurship preparation and the entrepreneurial self-efficacy (ESE) are the three variables that can affect entrepreneurial intention. However, need of achievement, risk propensity and locus of control have no significant impact on entrepreneurial intentions. Compared to the study of Stein's research among Indonesian and Norwegian students, this study is based on the empirical study of the entrepreneurial intention among ENACTUS college students during their Nascent Entrepreneurs Periods. It shows that the ESE and need for achievement have significant positive relationship with entrepreneurial intention. However, locus of control, risk taking propensity and tolerance for ambiguity shows no significant effect.

More importantly, Social Entrepreneurship Orientation, which is brought up in this article, shows significant positive relationship with entrepreneurial intention. These new findings contribute to understanding the attribution of the formation and development of college students' social entrepreneurship and entrepreneurial intention. Results of the regression analysis of entrepreneurial

intention show that Social Entrepreneurship Orientation has the strongest explanatory power on entrepreneurial intention, comparing to entrepreneurial self-efficacy and need of achievement as explanatory variables. It verifies that Social Entrepreneurship Orientation can solve social problems through the innovation of various business models. Therefore, these individuals and organizations are more inclined to solve social problems by entrepreneurial start-up efforts and have stronger entrepreneurial intention (Hechavarria, Renko & Matthews, 2012).

ENACTUS covers more than 200 universities in China. Members continuously carry out entrepreneurial activities every year. They are dedicated to community development and improvement of impacted people's livelihoods, in ways of creating and proceeding ENACTUS programs, according to the needs of communities and impacted people. They hold the constant belief of improving the community through practical entrepreneurial actions. This is the process of self-achievement and development of entrepreneurial intention of these nascent Entrepreneurs through social entrepreneurial activities. During this process, they make the best use of commercial opportunities to obtain the economic and social value of entrepreneurship. This kind of Social Entrepreneurship Orientation becomes the motive of the formation and development of entrepreneurial intention.

Entrepreneurial self-efficacy (ESE) has the second strong explanation strength over entrepreneurial intention. The primary purpose of social entrepreneurs is to

solve social problems and to continuously improve the social environment. Especially for nascent entrepreneurs, the perception of self-integration capability has significant impact over the entrepreneurial intention.

Under the special situation of nascent entrepreneurship, ESE contributes to the prediction and discovery of opportunities. When confronted with uncertain social environment, entrepreneurs with higher ESE have more sensitive perception in opportunities, while entrepreneurs with lower ESE have more sensitive perception in risk and expense. Therefore, students with higher ESE are more inclined to believe that they have the ability to solve problems and to discover opportunities. As a result, students with higher ESE have stronger entrepreneurial intention.

Achievement motive also has significant impact on entrepreneurial intention. Achievement motive means the motivation of an individual to assess success and pursue perfection.

Entrepreneurship caters to individuals with higher achievement motive; social entrepreneurial activities not only create economic value, but also create social value. College students have a strong sense of social responsibility; they desire to realize their social value through self-efforts. Therefore, social

entrepreneurship has multi-value attraction to entrepreneurs with strong achievement motive.

The results of the regression analysis also show that university social entrepreneurial activities in developed regions indicate higher entrepreneurial intention than those in underdeveloped regions.

However, the hypothesis testing, which shows that locus of control, risk propensity and tolerance for ambiguity have positive relationship with entrepreneurial intention, is not supported. The indicated reasons are as follows. The locus of control theory, which is brought up by Rotter (1966), explains the personal attitude towards the actions and consequences brought by personal traits .Internal characteristics have the preposition of attributing consequences to oneself, and hold the viewpoint that outer uncertainties affects self-actions less. As a result, they behold a more positive attitude towards entrepreneurship. Compared to other careers, self-employment faces greater uncertainty and challenge. However, college students, who just come upon the social stage as nascent entrepreneurs, show higher passion for new things and have more positive attitude towards future, therefore,

Because social entrepreneurship contributes to public welfare, it is easier to get support from outer environment such as academic professors, business people, government and etc.

Therefore, when their entrepreneurship are confronted with risk, social entrepreneurs sense a lower level of risk that affects the program, and the possible reason is a lower level of risk taking propensity. Consider that people with higher tolerance for ambiguity have inclination to view uncertain factors as opportunities, while people with lower tolerance for ambiguity view them as risks. It is possible that social entrepreneurs have a different view upon uncertainty from traditional entrepreneurs. For example, traditional entrepreneurs have a quantifiable as well as clear profit goal before developing entrepreneurial intention, as they view uncertainty as the uncertainty of profitability. However, social entrepreneurs put a greater value on public welfare achievements brought by their entrepreneurship. Normally, public welfare achievements cannot be quantified, but they can be achieved in some ways. Therefore, social entrepreneurs sense a lower level of uncertainty.

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Effects of entrepreneurial characteristics of successful managers of small and medium enterprises in rural areas (Case Study: The villages of Hamadan province, Iran)

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Abstract

The purpose of this study was to investigate the entrepreneurial characteristics of managers and its impact on the success of small and medium rural enterprises. The scope of this study was Hamadan province villages. The

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data for this study were obtained using survey and questionnaire. Cronbach's alpha coefficient was used to determine reliability of the questionnaire which it varied from 72% to 89% for each of questionnaire items. The population of this study was 738 managers of such firms which 250 of them were selected using Cochran formula. The data were analyzed using SPSS and LISREL software version 16 and multivariable regression was used to test the hypotheses. In this study, the impact of eight entrepreneurial characteristics were examined on the firm's success including, creativity, internal locus of control, risk-taking, achievement, tolerance for ambiguity, independence, self-confidence, and opportunities-recognition. The results of the regression analysis of variance indicated that there is a positive and significant relationship between entrepreneurial characteristics and success of firms. The results of regression coefficients also indicated that among entrepreneurial characteristics risk-taking, creativity, tolerance for ambiguity, and opportunities-recognition had a significant impact on business success of such enterprises.

1. Introduction

There is a broad consensus that a vibrant SMEs sector is one of the principal driving force in the development of a market economy and vital for a healthy economy (Nafukho and Muya, 2010). The men and women who run these enterprises are called entrepreneurs. Entrepreneurship is a company that undertakes new arrangement to produce new products and services (Schumpeter, 1934). It is a process of innovation and creation with four

dimensional elements –individual, organization, environmental factors and process, with support from the government, education, and constitution (Kuratko and Hodgetts, 2004). Historically, it is proven that that with each economic downturn in both developed and developing countries, it is the entrepreneurial drive and persistence that brings us back (Kuratko 2006). In this study, we focus on entrepreneurship as it takes place in SMEs since the two are closely related and cannot be isolated from each other.

Scientists and scholars of development believe that the root of many problems of developing countries like unemployment and employment problems is located in rural underdevelopment. In Iran, issues such as unemployment, rural-urban migration, marginalization and poverty are due to underdevelopment in rural areas and high rates of unemployment in rural areas. Today, rural small and medium-sized enterprises (herein referred to as SMEs) can contribute to diversify economic activities and to develop rural employment by creating new sources of income outside the farm. In addition, since these entrepreneurial firms are labor-oriented and do not require much capital expenditure, employment opportunities can be provided for the rural poor and those who have low levels of education especially women; and, hence these entrepreneurial firms should not be neglected in development.

According to the General Census of Population and Housing of Hamadan Province in November 2006, the total population of the province was 1703267 among which 980,771 people are located in urban areas, 721,225 people live in

rural areas, and 1271 of them have not been settled. In this province, although more than 80% of total agricultural production units are located in rural small and medium industries, these firms have not obtained a great share in GNP and added value; and they finally they are facing severe deficiencies and shortages due to the lack of a strategic-based development on existing structures.

It seems that reducing location and advantage of small businesses and industries compared to the large ones are affected by several inside and outside factors. To stimulate entrepreneurship in rural areas, governments are required to plan and implement development policies. To establish the efficacy in policy development, it is necessary to be aware about the factors affecting the success of entrepreneurship. Stimulating the economy and making it effective for job creation requires the cooperation of policy makers and entrepreneurs which this eventually will lead to the development of the country. One of the main issues in entrepreneurship is to identify the characteristics of entrepreneurs. Since creativity and innovation and exploring new opportunities are the most striking characteristics of entrepreneurs and, basically, behavioral characteristics (such as independence, achievement, risk-taking) require special and different conditions, identifying characteristics are the appropriate mean to attract and develop entrepreneurs which is the first and most fundamental issue (Kuratko et al, 2005). Considering the above, the main problem which has drawn the attention of researchers is to check whether the characteristics of entrepreneurial rural managers of small and medium enterprises affect the success of the business or not?

Small and medium-sized enterprises (SMEs)

In many countries, the criteria to differentiate small and medium industries from major industries are: the number of people employed in manufacturing, the volume of investment, value products, sales, and the like. In Iran, employment is the only factor to categorize SMEs. Statistical yearbook of the country has divided economic agencies into four categories: with 1-49 employees, 50-99employees, 100-149 employees, and more than 150 members. Rural small and medium businesses are small-scaled due to the small size of the villages and they are often between 10 - 20 persons. Such businesses have special performance due to the dominance of agricultural activities and workshops.

Entrepreneurial success and its relationship with entrepreneurial characteristics

The relationship between entrepreneurial success and personality and characteristics of entrepreneurs are studied in the various studies. Kuratko and colleagues (2004) found a series of factors in the implementation of an idea or an entrepreneurial activity necessary which one of them is personal characteristics in the entrepreneurial process (Kuratko et al, 2004). Begley and Boyd studied the relationship between entrepreneurial successes which is measured with the financial growth and return of investment and with the

following characteristics: achievement, internal locus of control, risk-taking and tolerance of ambiguity (Begley and Boyd, 1987).

The word enterprise has been used in a range of contexts and meanings (Bridge, O'Neill & Cromie 2003). Salminen (2000) describes an enterprise as a controlled system consisting of a detector, a selector and an effector. The detector is the function by which a system acquires information about its environment, which is then used as the basis of the selection of a behavioral response by the selector. Finally, the behavior is executed by the effector. The measurement system of an enterprise gathers information about the changes in both the environment and the performance of the enterprise. This information is then used together with the values and the preferences of the enterprise and its management to produce decisions about the required actions. As a result, the outputs of the enterprise – the products, the services, the operational performance and the financial performance - are changed.

Over the past few decades, research has tried to explain how SMEs can overcome this liability of foreignness and improve international performance (Brouthers et al., 2009; Nakos et al., 1998). Over the years, researchers have discovered strong links between the possession of entrepreneurial orientation capabilities and firm performance (Rauch,Wiklund, Lumpkin, & Frese, 2009).There is some concern in the literature about what is meant by international performance and how best to measure it (Hult et al., 2008; Keupp & Gassmann, 2009). We define international performance as the performance

an SME achieves in a specific foreign market (He, Brouthers, & Filatotchev, 2013).

Research into small and medium sized enterprises (SMEs) has grown during the last decade. A huge majority of firms worldwide are SMEs, and they play a significant role in the economy. Consequently, the performance of the SME sector is closely associated with the performance of the nation. The secret of firm success has long fascinated people, but most of the studies have focused on large companies. However, as we know, some firms succeed and others fail. In Iran, despite the fact that some SMEs have been growing and are successful, some of others have been decline or stagnant. This study aims to find out effects of entrepreneurial characteristics of successful managers of small and medium enterprises in rural areas.

Small and medium-sized enterprises (SMEs) are not smaller versions of larger companies, but mainly due to their size they tend to interact differently with their environment (Shuman & Seeger, 1986). What differentiates SMEs from large multinational enterprises (MNEs) are their managerial style, ownership, and independence (Coviello & McAuley, 1999). Moreover, their limited resources may lead them to very different international strategic choices in comparison to larger firms (Zacharakis, 1997; Erramilli & D'Souza, 1993).Few scholars have examined SME entry mode choice. Recent research by Nakos and Brouthers (2002), Yi-Sheng, Po-Yuk, and Wai-Sum (2001), and Brouthers,

Brouthers, and Werner (1996) has applied Dunning's Eclectic Framework to SME entry mode choice.

Previous studies dealing with the conditions of successful business have focused on large companies rather than SMEs. However, changes in the environment cause more uncertainty in SMEs than in large companies. Their resources for acquiring information about the market and changing the course of the enterprise are more limited.

The response to environmental changes is different in SMEs than in large companies. Large firms may even exit from one of its business areas, but this is not usually possible in a single-business firm. The options for responding are limited by the firms' resources and strategic choices as well as by the opportunities offered by the industry and location. Those ways may also differ between the development stages of the firm. The role and contribution of SMEs differ from industries to industries and from countries to countries. Similar to other businesses, SMEs also face miscellaneous problems which in some instances may affect their profitability and growth. In order to cope with the constant rapid changes in business environment, having a well-versed good business manager is vital to the organization.

SMEs stimulate private ownership and entrepreneurial skills, are flexible and can adapt quickly to changing market demand and supply situations, generate employment, help diversify economic activity, and make a significant

contribution to exports and trade. Even in the developed market economies SMEs account for a large share in output and employment (UNECE, 2003). Iran has thus far failed to maximize the benefits derived from the SME sector, which promises and needs to play a pivotal role in promoting and sustaining the industrial as well as overall economic growth (Ahmed M. U., 2003). The failure can be attributed to various reforms and trade liberalization measures that have squeezed the sphere of Government's activity in business.

Consequently, the private sector has to lead the economy in a dynamic growth path. Most of the previous studies dealing with the conditions of successful business have focused on large companies rather than SMEs (i.e., Ghosh and Kwan, 1996; Kauranen, 1996 and Pelham, 2000). However, changes in the environment cause more uncertainty in SMEs than in large companies. Their resources for acquiring information about the market and changing the course of the enterprise are more limited. The response to environmental changes is different in SMEs than in large companies. Large firms may even exit from one of its business areas, but this is not usually possible in a single-business firm. The options for responding are limited by the firms' resources and strategic choices as well as by the opportunities offered by the industry and location. Those ways may also differ between the development stages of the firm. SMEs have long been believed to be important in supporting economics development within a country (Mazzarol, Volery, Doss, & Thein, 1999).

One of the important roles of SMEs in this context includes poverty alleviation through job creation. Thai SMEs are increasingly seen as creator of new jobs (Swierczek & Ha, 2003) and Vietnamese SMEs employ 64% of industrial workforce. Therefore findings on SMEs will help the Iranian policymakers and also other help other developing countries in general to formulate strategies to strengthen and stabilize SMEs operations in respective countries.

Zhao, in his study entitled, "a new look at the creative process of entrepreneurship" deals with the relationship between Personality and the rate of entrepreneurial activities. He considered creativity more important than other personal characteristics. He added that researchers can still add considerable values to the literature on personality characteristics of entrepreneurs. In this review article, which is published in Strategic Entrepreneurship Journal, it is discussed that creativity plays an important role in the entrepreneurial process.

Firm performance refers to the firm's success in the market, which may have different outcomes. Firm performance is a focal phenomenon in business studies. However, it is also a complex and multidimensional phenomenon. Performance can be characterized as the firm's ability to create acceptable outcomes and actions.

Success, in general, relates to the achievement of goals and objectives in whatever sector of human life. In business life, success is a key term in

the field of management, although it is not always explicitly stated. Success and failure can be interpreted as measures of good or indifferent management. In business studies, the concept of success is often used to refer to a firm's financial performance. However, there is no universally accepted definition of success, and business success has been interpreted in many ways (Foley & Green 1989).

There are at least two important dimensions of success: 1) financial vs. other success; and 2) short- vs. long-term success. Hence, success can have different forms, e.g. survival, profit; return on investment, sales growth, number of employed, happiness, reputation, and so on. In other words, success can be seen to have different meanings by different people. In spite of these differences, people generally seem to have a similar idea of the phenomenon, i.e. of what kind of business is successful.

Finally, considering the available evidence in literature about the relationship between entrepreneurs' features and entrepreneurial success, the effect of the following 8 characters of creativity, internal locus of control, risk-taking, achievement, tolerance for ambiguity, independence, self-confidence, and opportunity-recognition on the success of entrepreneurial managers of rural SMEs of Hamadan Province is investigated; also, regarding demographic and personality distribution of entrepreneurs, 5 indices of growth, innovation, profitability, personal satisfaction, and customer satisfaction were used to measure entrepreneurial success.

Research Objectives

- To investigate the entrepreneurial characteristics of managers of small and medium enterprises in rural areas of Hamadan Province,
- To evaluate the success of such enterprises in rural areas of Hamadan Province, and
- To scrutinize the effects of entrepreneurial characteristics of Managers of such enterprises on successful businesses in rural areas of Hamadan Province

2. Methodology

This article is an applied research which is written by analytical method. Data collection method is field and documentary method. So that library research was used for theoretical foundations and to collect data the questionnaire was used. This is a descriptive research since the current situation is the result of an investigation and the application of its findings describes the current situation.

With respect to the objectives of the study, the characteristics of entrepreneurs, indicators and variables of the study, a questionnaire consisting of 37 items was adjusted. Cronbach alpha coefficient was used to assess the reliability of the questionnaire in which it varied from 72 % to 89 % for the questionnaire items. We also claim that the questionnaire items are valid enough because the questionnaire parameters and variables had been widely used in entrepreneurial studies. In this study, two-stage random sampling method was used. The research population includes 738 managers of rural small and medium enterprises in Hamedan province which 250 of them were selected through Cochran formula. For data analysis, the components are coded and then SPSS software was used for the analysis. Also to explain and analyze the data and to answer the research question, first, descriptive statistics were used to extract frequency and percentage and the frequency of questions were drawn and presented in tables. For inferential statistics, multivariate regression analysis was used.

Research Findings:

The results of table 1 suggest that 87.2 percent of participants were male and only 12.8 of them were female which indicates a higher rate of entrepreneurial activities among males. It is essential to investigate the low rate of entrepreneurial behavior among women. Age group of less than 30 years allocated 30.8 % of the population which indicates the young age of the participants. On the other hand, 47.2 % of the populations were aged between 30 - 40 years which allocated the top frequency among the 4 age groups contained in the following table. The highest level of education of business managers was diploma that allocated 53.6 percent of the total sample. The samples whose education level is higher than diploma are 36.8 percent. However, no respondents have been illiterate.

gender			age			Education level		
title	frequency	percentage	title	frequency	percentage	title	frequency	percentage
Female	32	12.8	Below 30	77	30.8	Elementary	9	3.6
			31 - 40	118	47.2	Junior	15	6
Male	218	87.2	41 - 50	54	21.6	Diploma	134	53.6
			More than 50	1	0.4	More than diploma	92	36.8
total	250		total	250	100	total	215	100

Table 1: individual characteristics of managers of small and medium enterprises

According to the results shown in table 2, coefficients of variation of the components of the entrepreneurial characteristics are presented, respectively.

In this study, entrepreneurial success including innovation, job satisfaction, customer satisfaction, and profitability is measured with 13 items that the following table shows the distribution of these components. As it can be observed in table 3, the coefficient of variation of customer satisfaction, among the other components of entrepreneurial success, is 0.12 which is the greatest amount.

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Table 2: Descriptive statistics of the entrepreneurial characteristics

Entrepreneurial characteristics	mean	Standard deviation	Variation coefficient
achievement	4.24	0.50	0.12
internal locus of control	4.03	0.61	0.15
creativity	3.55	0.64	0.18
self-confidence	4.09	0.75	0.18
tolerance for ambiguity	2.90	0.75	0.26
independence	3.62	1.04	0.29
opportunities-recognition	3.45	1.06	0.31
risk-taking	3.39	1.10	0.32

To investigate the significant relationship and influence of the success of firms, as the dependent variable, and the entrepreneurial characteristics of managers, as independent variables, regression analysis was used. In the analysis of regression, correlation coefficient is initially determined.

Table 3: Descriptive statistics of entrepreneurial success

Entrepreneurial success	mean	Standard deviation	Variation coefficient
customer satisfaction	4.25	0.52	0.12
job satisfaction	3.81	0.87	0.22
innovation	3.50	0.91	0.26
profitability	2.79	0.48	0.30
growth	2.70	0.88	0.32

According to table 4, the correlation coefficient (R) is 0.658 expressing the fact that successful firms and characteristics of entrepreneurial managers have a strong relationship with each other. Determination coefficient of regression equation is 0.433 expressing the fact that about 44.3 % of the variations of dependent variable (successful firms) is determined by the independent variable which is an acceptable value.

Table 4: correlation coefficient and determination coefficient of entrepreneurial characteristics of managers on the success of firms

Variation coefficient	determination coefficient	Adjusted determination coefficient	Estimated standard error
0.658	0.433	0.421	1.18

As table 5 indicates, F test is 26.407 which is significant at 0.000 level. Since the significance level is more than 0.01, it can be claimed that the hypothesis of the influence of entrepreneurial characteristics of managers on the success of firms is ensured with the possibility of 99 percent.

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Table 5: the analysis of regression variance of the relationship between entrepreneurial characteristics of managers and the success of firms

	Total square	of Freedom degree	Square mean	F	Sig.
Regression	1034.810	7	147.830	26.407	0.000**
Surplus	1354.729	242	5.598		
total	2389.539	249			

** Significant at 99 percent level

Coefficients of regression models were also used determined.

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Table 6: Variance regression coefficients of the relationship between entrepreneurial characteristics of managers and success of firms

	Non-standardized coefficient		Standard coefficient	T	Sig.
	B	Standard error	Beta		
Constant	6.292	1.478		4.256	**0.000
independence	0.256	1.178	0.086	1.436	0.152
Achievement	-0.126	0.348	-0.021	-0.364	0.716
risk-taking	1.244	0.185	0.443	6.717	**0.000
creativity	0.748	0.273	0.154	2.735	0.007
tolerance for ambiguity	1.088	0.340	0.264	3.197	0.002
opportunities-recognition	1.400	0.179	0.479	7.822	**0.000
self-confidence	0.449	0.294	0.108	1.527	0.128

** Significant at 99 percent level

As table 5 shows, the significance of risk-taking, creativity, ambiguity tolerance and opportunity-recognition is lower than 0.05; so, it can be concluded that these dimensions affect the success of enterprises with the possibility of 95 percent. In the following regression equation, these four influencing variables are presented. INTER method was used to place the variables into the regression equation.

$$y = 6.292 + 0.1.244\, x_1 + 0.748\, x_2 + 1.088\, x_3 + 1.4 x_4$$

LISREL software was used to depict the relationship between the determined variables in the study.

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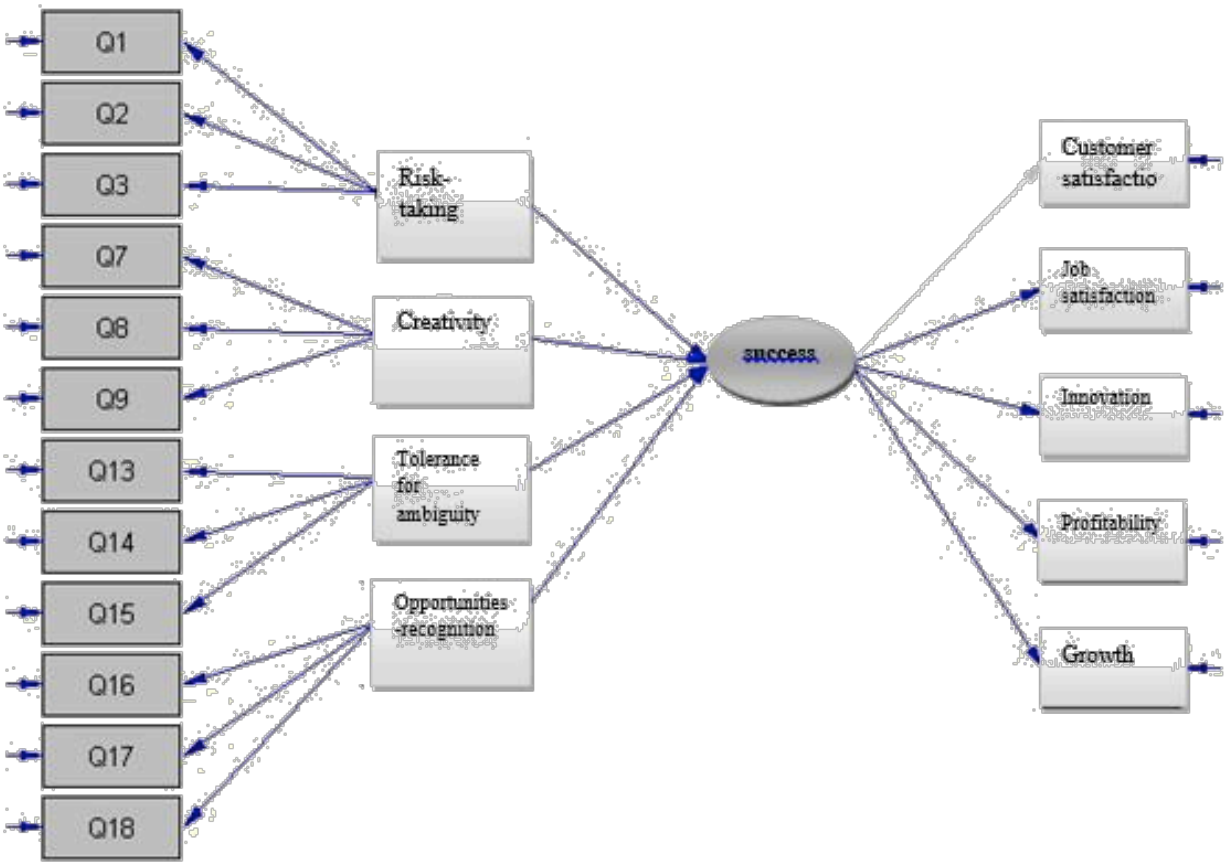

Figure 1: the extracted operational model of path analysis

A review of under-consideration models

To evaluate the model, first, we need to assess the whole model and then examine the details. To evaluate the model, at least one of proposed indicators in absolute fit, relative fit and modified fit evaluated is evaluated for the sake of testing the model. The table below shows the indicators derived from the fitted model.

Table 7: Indices derived from the fitted model

Statistics	Chi square	Degree of freedom	Chi square/degree of freedom	The root of square mean error	Goodness of fit index	Adjusted goodness of fit index
Conceptual Model	306.64	164	1.87	0.84	0.93	0.91

Given the LISREL output which presented in the table above, x^2/df in this model is less than 3 and the obtained value 1.87 indicates a good fit of the model. The roots of square mean error should be approximately must less than 0.8 which equals 0.84 in this model. Goodness of fit index and adjusted goodness of fit index should be more than 0.9 which is true in this model.

According to the indicators and outputs of LISREL software, it can be said that the data are appropriately consistent with the model and the proposed indicators indicate that the proposed model is, totally, an appropriate one and experimental data are consistent with it.

Now, the details of the model are examined by the estimated model and the T-Values and then the hypotheses will be tested.

Standard Model estimation

The following figure indicates the estimated values of factor loadings. These values show the raw scores of predictive factors.

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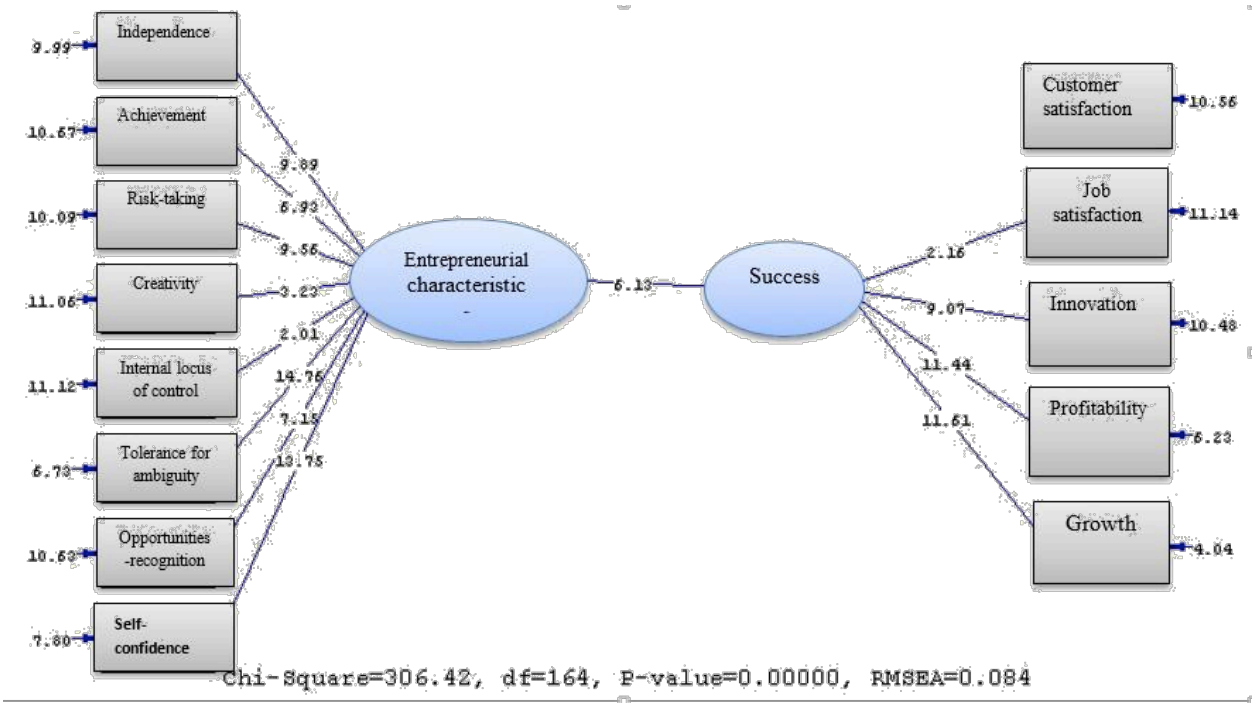

Figure 2: The estimated factor loadings

T-values model

Here, an observed value of T is obtained through the amounts of raw data for each parameter which the analysis of these amounts is as follows: When the sample size is greater than 30 and T is more than 1.96, with more than 95 percent confidence derived the relationship is significant. The following figure shows T values obtained from the model.

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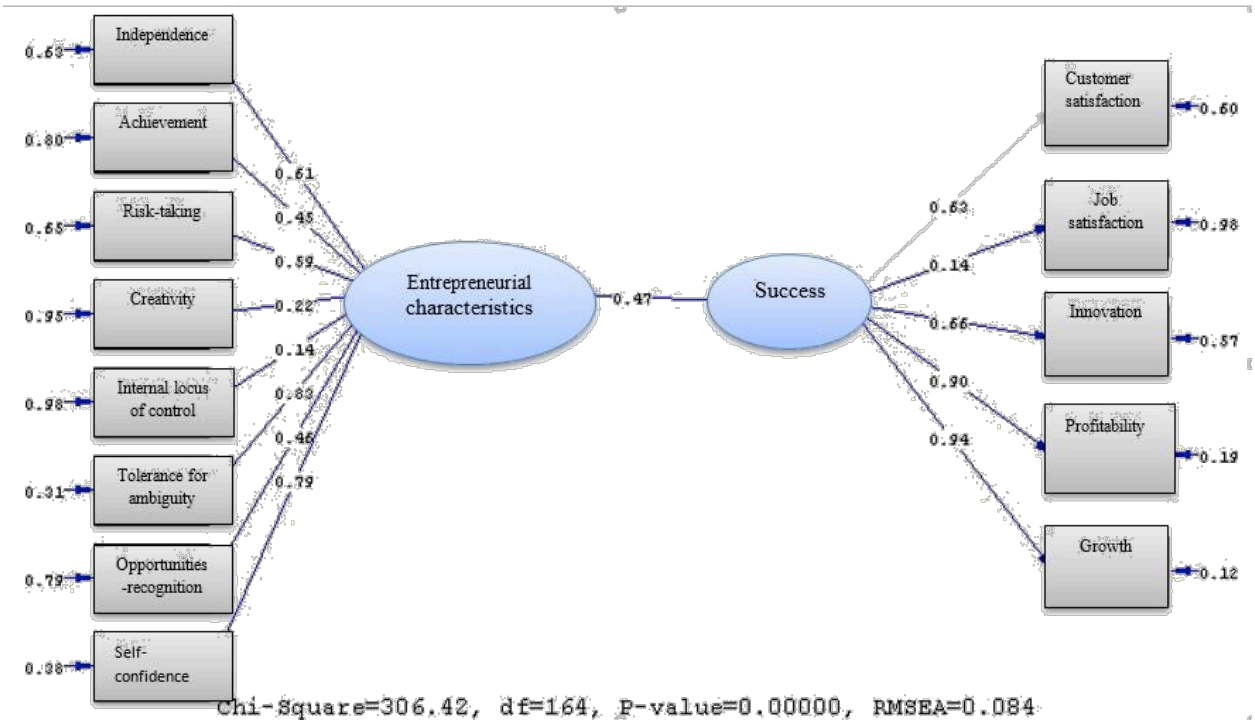

Figure 3: T-values Model

As is clear from table, the standard coefficient of structural equation between entrepreneurial characteristics and entrepreneurial success is 0.47 and the t-statistic equals 6.13. The hypothesis claiming the significant relationship between entrepreneurial characteristics and entrepreneurial success is confirmed with 95% confidence since the t-statistic resulting in structural equation (6.13) is more than 1.96. In addition, the standard coefficient is positive. This means that by increasing and improving the entrepreneurial characteristics entrepreneurial success will be increased.

3. Conclusions and recommendations

As was observed, the age of managers 47.2 was between 30 - 40 years. On the other hand, 30.8% of the total amount of the study aged less than 30 years shows the relatively young age of the population. These results indicate that entrepreneurial managers of the study were categorized in college age and must acquire training and skills to become successful. This indicates that universities and educational centers need to implement some changes in their educational programs. 87.2 % of the gender of managers are male and only 12.8 % of them (32 people) were female. But why the women participating in this business unit is less? The answer to this question needed more research but perhaps women's lack of familiarity with the necessary skills to establish businesses is the main reasons cited for this issue. The dominant education of the sample is diploma and upper diploma. Maybe this shows the effect of education and knowledge in learning entrepreneurs and business skills. The results indicated that planning to train entrepreneurs to manage business units should be in school, universities and training centers.

According to the results of descriptive statistics regarding the relationship between entrepreneurial characteristics and the business success, it was observed that the characteristics and components of successful entrepreneurial firms are relatively high among respondents. Also, the result of the regression coefficient regression indicates that approximately 43% of changes of dependent variable of successful firms are explained by the dimensions of entrepreneurial characteristics. The results of regression ANOVA showed that there is a significant correlation between the success of businesses and entrepreneurial characteristics and dimensions; this is in line with the research outcomes of

Kuratko and colleagues (2005), Islam and Baharul (2009), and Haase and Lautenschlager (2010). The results of the regression coefficients indicate that risk-taking, creativity, ambiguity tolerance and opportunities-recognition had a significant impact on business success among entrepreneurial characteristics.

Recommendations

1. According to the results, participation of rural women in business is very pale. Since business and management principles today are different and rapid changes in the business environment are occurring and the competition is tighter, we recommend further training skills such as accounting, language learning, management and marketing skills required for success in the competitive business should be taught in universities.

2. It is strongly recommended to hold top entrepreneurs' festivals to identify and promote rural entrepreneurship, to create role models, to benchmark for the youth which leads to business activities, stronger spirit and higher perseverance. Such programs cause successful entrepreneurs which had distinct personality characteristics than other people to be considered as a model and the others will strive to strengthen such features.

3. It is recommended to interested scholars to design and develop effective components regarding the development of entrepreneurship in rural SMEs which is not focused in this study. They can also do comparative studies in different countries on the development of entrepreneurship in small and medium-sized enterprises.

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