

# Self-gain – A possible solution to the mystery behind entrepreneurial propensity

By Dr. Chivukula Venkata Ramana



## Abstract

Entrepreneurial propensity is one of the areas in entrepreneurship on which there are very few in-depth studies. In spite of a few phenomenal studies highlighting important factors like 'tolerance for ambiguity', 'low opportunity costs', 'family background', 'chance events', 'need for achievement', 'independence', and 'locus of control', entrepreneurial propensity remains a mystery to researchers. The present study suggests that self-gain contributes to the entrepreneurial propensity of individuals and is a possible solution to the mystery behind entrepreneurial propensity of individuals.

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**Introduction** Entrepreneurial propensity is one of the areas in entrepreneurship on which very few in-depth and elaborate studies have been made. There has been a serious disagreement among researchers on the personality profile of entrepreneurs. This suggests that entrepreneurial propensity is also one of the topics on which there is a serious disagreement among researchers. The vast difference in the socio-economic background of entrepreneurs has been one of the major causes for the disagreement among researchers on the topic of entrepreneurial propensity. Researchers have focused more on the entrepreneurial propensity of corporate managers, CEOs, venture capitalists etc., while neglecting the entrepreneurial propensity of individuals. The entrepreneurship education boom in the 1980s in North America, especially USA, brought many changes in the interests and preferences of those involved in entrepreneurship development. Academicians, researchers, and policy makers have tried a variety of methods to promote entrepreneurial propensity by conducting entrepreneurship awareness camps, business plan contests etc. Although these activities have been useful to a large extent in the Indian context, a major issue has not been resolved, which comprises the identification of prospective individuals who can be educated and trained to achieve great success in entrepreneurship.

With the 1980s, start-up became fashionable and the success stories of entrepreneurs, especially in the context of USA, have attracted the attention of academicians and researchers. Interest in entrepreneurship education soared on business school campuses (Bhide 2000). Ethan Bronner observed that there is no field, which is hotter today in business studies than that of entrepreneurship (Bhide 2000). Students from different academic disciplines looked to entrepreneurship as serious career choice. There are three main categories of entrepreneurship research, which are as follows:

Category 1: What entrepreneurs do?

Category 2: What are the outcomes of entrepreneurs' actions?

Category 3: What are the factors affecting entrepreneurial propensity?

Researchers have neglected the topic of entrepreneurial propensity because of the failure of the identification of a distinctive personality profile of entrepreneurs. Following David McClelland's pioneering research, various researchers have attempted to identify the personality attributes that characterise the entrepreneur. Researchers have tried to find the different factors that affect entrepreneurial propensity of individuals, corporate managers, CEOs and venture capitalists (VCs). There are two major reasons for the inconclusive results of profiling studies viz., 'measurement problems' and 'difference in the definition of entrepreneurs'. Researchers do not have instruments designed to measure the traits entrepreneurs are supposed to possess and are forced to use measures intended for other purposes (Bhide 2000). This has led to some researchers to abandon the search for a single entrepreneurial profile in favour of identification of multiple types whose entrepreneurial propensity is derived from a variety of sources.

Researchers believe that, to a large extent, entrepreneurial propensity can be created in individuals. Various methods have been adopted by entrepreneurship educators and trainers to motivate individuals to take up entrepreneurship seriously and run their own businesses than working for somebody. Case studies on successful entrepreneurs, field trips to reputed companies, and guest lectures by successful entrepreneurs and venture capitalists are some of the popular methods for teaching students various aspects of entrepreneurship education. Business incubators at business schools and engineering colleges have also been playing a crucial role in developing entrepreneurial propensity of students and prepare them for a successful career in entrepreneurship.

## Research Questions

The three research questions addressed by the study are as follows:

- (i) Other than tolerance for ambiguity, family background, chance events, and opportunity cost, is there any attribute that contributes to the entrepreneurial propensity of individuals?

- (ii) Why do some individuals prefer a satisfying approach to an optimising approach in the pursuit of becoming entrepreneurs?
- or
- Why does the specific decision making of individuals who are plunging into entrepreneurship not aiming at obtaining maximum utility in all contexts?
- (iii) Why do individuals who do not fulfill the criteria of entrepreneurial propensity as mentioned in entrepreneurship literature? (like 'low opportunity cost', 'non-business family background', 'no-chance events', and 'low tolerance for ambiguity') are found to become entrepreneurs?
- (iv) Why are some individuals willing to start small and uncertain businesses in spite of 'lack of expertise and/or knowledge'?

## Literature Review

Amar V. Bhide interviewed 100 entrepreneurs from the Inc. magazine list of 500 promising firms in USA. Bhide (2000) in his study focused on two major aspects namely 'entrepreneurial success' and 'growth of the venture'. Bhide's study addressed the following two major research questions:

- (i) What is the secret of start-up success?
- (ii) Why are only a very few start-ups transformed into large and well-established firms?

Bhide's answers to the above-mentioned research questions respectively were as follows:

- Tolerance for ambiguity is the secret of start-up success.
- To start and run a small business successfully, entrepreneurs need basically two attributes, namely 'tolerance for ambiguity' and 'sales skills'. However, to transform a small business into a large and well-established business, entrepreneurs need risk taking and ambition. Very few entrepreneurs have both risk taking and ambition and hence, only a very few start-ups are transformed into large and well-established firms.

Mark H. McCormack's study was based on his informal discussions with entrepreneurs and executives. McCormack was a lawyer turned entrepreneur and wrote a book titled, 'What they don't teach you at Harvard Business School'. Industry Knowledge and Sales Skills enhance the chances of success in a new business (McCormack 1984).

Arch Dooley interviewed many entrepreneurs with an aim to explore the factors that have contributed most decisively to Entrepreneurial Success. The factors that contribute most decisively to Entrepreneurial Success are timing, guts, determination and luck (Dooley 1983).

John B. Miner conducted a research study on entrepreneurs with an aim to identify personality types among entrepreneurs and explore entrepreneurial success. The sample in Miner's study consisted of 100 entrepreneurs in

Buffalo, New York area. Miner (1990) identified four types of entrepreneurs, which are as follows:

- Personal Achievers
- Supersales People
- Real Managers
- Expert Idea Generators

Miner concluded that there are four routes to entrepreneurial success from which entrepreneurs should choose the appropriate route to success based on their personality type.

The propensity to start a new business is based on four factors viz., 'family background', 'chance events', 'opportunity cost', and 'tolerance for ambiguity' (Bhide 2000). Entrepreneurial propensity is also based on another factor namely 'a feeling that if an individual never tries he or she would always regret it' (McCormack 1984). Panda (2005) conducted a study on small businesses in the state of Orissa (India) and suggested that entrepreneurial seriousness is linked with entrepreneurial propensity. Although, the above-mentioned studies have explored the area of start-ups, the studies have raised two major questions. First, why are many individuals who are found to have a low tolerance for ambiguity, starting new businesses. Second, how can opportunity cost, which can be avoided by working part-time on the business be a valid factor on which entrepreneurial propensity depends to a large extent. Being an entrepreneur is often viewed as an aversive career choice where an individual is faced with everyday life and work situations that are fraught with things like uncertainty, impediments, failures and frustrations, which are associated with the process of new venture creation.

A majority of studies on entrepreneurial performance especially in the context of start-ups, emphasise on motivation on one of the key elements. The progression of theories on entrepreneurial motivation has been from context-based theories to process-based theories (Panda 2005). Gilad and Levis (1986) proposes two closely related explanations of entrepreneurial motivation namely, 'push' theory and 'pull' theory. The 'push' theory argues that negative external factors like job dissatisfaction, difficulty in finding employment, insufficient salary or inflexible job schedules propels an individual to choose entrepreneurship as a career. The pull theory suggests that individuals are enticed towards entrepreneurship in order to seek desirable outcomes like independence, self-fulfillment and wealth.

Prior research examining what motivates individuals to be entrepreneurs has predominantly relied on the disciplines of psychology and sociology. Douglas and Shepherd (2000) argue that the decision to be an entrepreneur is a utility maximising career choice made by an individual - people choose to be self-employed if the total utility they expect to derive (via income, independence, risk bearing, work effort, prerequisites), is greater than from their best employment option. Evans and Leighton (1989) call for the investigation of behaviour models that can help explain the choice of self-employment. Individuals intend to become entrepreneurs because their model of utility maximisation differs from those that intend to remain employees.

Casson (1982) acknowledged that there was no economic theory of

entrepreneurship. Casson (1982) proposed a theoretical model but the model did not adequately address the issue of "Why people become entrepreneurs"? Baumol (1990) proposed that "how the entrepreneur acts at a given time and place depends heavily on the reward structure in the economy (or) the prevailing rules of the game that govern the payoff" to entrepreneurship. In defining entrepreneurs as persons who are ingenious and creative in finding ways to add to their own wealth, power, and prestige. Although Baumol was effectively suggesting that individuals choose to be entrepreneurs when or because their utility (from wealth, power, and prestige) is maximised by doing so, his purpose was primarily to examine the "What entrepreneurs do?" question rather than "Why entrepreneurs do it?" question.

Campbell (1982) stated, "Economic theory has yet to make a concerted effort at explaining entrepreneurship or its determinants and developed a model where the individual chooses to be an entrepreneur if the expected net present value of profit from entrepreneurship is positive, or supplies labour otherwise. While Campbell allowed for the individual's attitude toward risk and the monetary value of the psychic costs and benefits of entrepreneurs, he did not consider how these psychic costs and benefits impact the decision to become an entrepreneur except via their (monetary equivalent) impact on the NPV calculation. Nor did he explain why these psychic costs and benefits might differ from person to person.

Gifford (1993) distinguishes between entrepreneurial ability and managerial ability. Gifford (1993) proposes that the entrepreneur is alert to and responds to profit opportunities, and the career choice depends on the expected profit as an entrepreneur. Although the Gifford (1993) model advances our thinking substantially, it is more concerned with the optimal size of the firm than it is with what motivates individuals to be entrepreneurs (other than a simple profit motive).

Eisenhauer (1995) builds an economic model of the decision to be an entrepreneur based on the expected utility gained, not simply from the prospective income stream but also dependent on utility derived from the "working conditions", of the employment versus self-employment alternatives. Douglas and Shepard (2000) followed the Eisenhauer model but expanded it substantially to link income potential to an individual's ability and entrepreneurial attitude. Furthermore, Douglas and Shepard investigate the working conditions in terms of the individual's attitude to specific work conditions such as work effort required, risk exposure, and independence (or decision-making autonomy). Thus, Douglas and Shepard (2000) developed a theory of entrepreneurs that explains an individual's choice to be self-employed, or to be an employee of an existing organisation, by utilising a utility-maximisation model of human behaviour - the individual will choose the career option that promises the greatest expected utility. They consider three main attitudes, which one might expect to differ between those intent to become self-employed. These attitudes are those towards (i) hard work, (ii) financial risk, (iii) decision-making autonomy, which they call "independence". They conclude that "positive" attitudes in these areas are neither necessary nor sufficient for self-employment, since an entrepreneurial individual may be paid enough, and/or given enough independence and prerequisites to remain in the employment of another firm.

Robinson, Stimpson, Huefner and Hunt (1991) support the use of "attitudes" to understand entrepreneurial tendencies, as they are a better predictor than personal characteristics. The possession of entrepreneurial attitudes does not necessarily motivate a person to start a new venture. We note that even with the strongest intentions to be an entrepreneur, no entrepreneurship will occur without the advent of a suitable self-employment opportunity and the funding required to undertake that opportunity.

Douglas and Shepherd (2000) argue that entrepreneurial propensity is a function of three factors, each associated with one of the relationships: (1) One's perceived level of entrepreneurial education, knowledge and competence concerning new venture operation, (2) One's beliefs concerning entrepreneurial opportunities in the economy (i.e. financial rewards and employment), and (3) one's confidence in his ability to access the available opportunities (self employment and risk).

Grenholm (2001) mentions various motivational factors for starting a company by categorising the factors into six groups:

Group 1: Independence

Group 2: Money

Group 3: Making ideas real

Group 4: Ethics

Group 5: Research connection

Group 6: Participation and ownership

**Gaps in Earlier Research Studies:** Although earlier research studies have explored the concept of entrepreneurial propensity based on theoretical and empirical analysis, some of the important issues pertaining to entrepreneurial propensity have not been covered adequately. First, earlier research studies have assumed that individuals are subjected to only four deterrents namely "Opportunity Cost", "Tolerance for Ambiguity", "Risk Aversion" and "Fear of Failure". Furthermore, researchers did not investigate into the different ways how individuals would try to overcome the deterrents.

There are at least four areas in which in-depth studies on Tolerance for Ambiguity are needed. First, variation in levels of ambiguity tolerance demonstrated by individuals. Second, the correlation between risk taking and tolerance for ambiguity. Third, sources of tolerance for ambiguity in individuals. Fourth, the possibility of developing tolerance for ambiguity in individuals through education and/or training. Bhide's elaborate and systematic study of start-ups describes tolerance for ambiguity in a lucid manner. However, Bhide's research work raises the following questions regarding tolerance for ambiguity:

- (a) Other than "self-confidence" and "low weight that individuals place on social and psychological consequences of failure", what are the sources of tolerance for ambiguity?
- (b) Are ambiguity aversion and uncertainty avoidance related to each other?
- (c) Why do individuals demonstrate a high tolerance for ambiguity in

some situations and low 'tolerance for ambiguity' in other situations? In other words, why do individuals who are not taking advantage of "heads I win, Tails I don't lose situation" in the context of starting a new business, are taking advantage of "heads I win, Tails I don't lose situation" in other pursuits?

- (d) What is the role of 'tolerance for ambiguity' in the case of individuals who have first decided to start a new business and then searched for opportunities? In other words, can the propensity to start a new business be contributed to 'tolerance for ambiguity' in the case of a purposive search made by start-up entrepreneurs?
- (e) Is the uncertainty associated with all start-ups so high that individuals need a high tolerance for ambiguity? This is very important because entrepreneurs and consultants suggest that there is very little uncertainty in operating a new business through imitation.
- (f) Are attitudes towards risk and attitudes towards ambiguity uncorrelated in all situations? This question can be raised based on the debate about the correlation between risk taking and tolerance for ambiguity.

Theoretically, three things demonstrate a high tolerance for ambiguity in an individual. The first thing is having a "Heads I win. Tails I don't lose" proposition (Bhide 2000). The second thing is jumping into things when the chances are not known (Bhide 2000). The third thing is going ahead in pursuit of an activity with lack of information and other resources (Bhide 2000). If researchers can find whether start-up entrepreneurs demonstrate the above-mentioned three things, it will help them to corroborate their findings from the measurement of tolerance for ambiguity.

Many researchers have sought for personality traits that are prominent among entrepreneurs. According to Shane, when these traits are compared between entrepreneurs and general population, the difference is small and it disappears when entrepreneurs are compared to managers. A reasonable conclusion is that personality alone cannot explain why some individuals decide to become entrepreneurs. Prior research on entrepreneurial propensity has relied mostly on the disciplines of Psychology and Sociology. More recently, there have been many important contributions from an economic perspective. Examples of such contribution include Baumol (1990); Gifford (1993); Douglas and Shepherd (2000).

## Concept of Self-gain

Self-gain can be defined as a willingness to promote or add values to others only when the contribution of other individuals is perceived to be commensurate with one's own contribution. The researcher identified four major dimensions of self-gain, namely attitude, perception, contribution, and motivation. Individuals with high self-gain believe that at some point of time, working for somebody will only stagnate them while promoting others. Self-gain derives out of a perception of individuals that employment

is not the right path to achieve career satisfaction and happiness. A special instrument was designed for measuring self-gain. A thorough literature review of entrepreneurial attributes and discussion with academicians, entrepreneurs, consultants and trainers was made before designing the instrument for measuring self-gain.

## Methodology

The present study is a part of a larger research study conducted across five states in India including Andhra Pradesh, Delhi, Karnataka, Maharashtra, and Tamil Nadu. In the case of entrepreneurs, the sample size was 200 and five attributes of entrepreneurs namely 'Industry Knowledge', 'Street Smarts', 'Tolerance for Ambiguity' and 'Impact of Personal Selling', and 'Self-gain' were measured. The entrepreneurs were also asked a few open-ended questions related to their motivation to become entrepreneurs. Furthermore, the entrepreneurs were asked two open ended questions that were designed to explore their self-gain.

For the exploration of entrepreneurial propensity among individuals who were not yet entrepreneurs, research was conducted among 250 students in Andhra Pradesh. Entrepreneurial Propensity and Self-gain were measured for the 250 students. Out of the 250 students, 100 students were pursuing MBA course, 50 students were pursuing polytechnic course and 100 students engineering course. For the purpose of survey, a multi-item likert scale was administered having five-point agreement index: This is because a scale measure is found to be more accurate in attitudinal measure as compared to direct and rank order measures in similar kind of researches. A five-point scale helps the respondent to distance the degree of agreement with suitable accuracy in comparison with other kinds of measurements. It is also helpful for summary evaluation of statistics. The measurement scale on entrepreneurial propensity was developed after referring to some previous studies on entrepreneurial propensity. In addition to this, a few other aspects that demonstrate entrepreneurial propensity in the context of new businesses were considered to develop the scale on entrepreneurial propensity.

## Results and Discussion

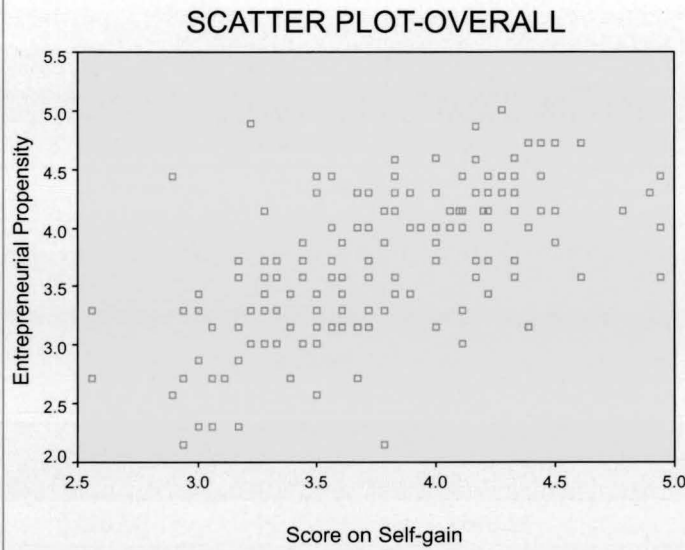
**Table 1**  
Mean and Standard Deviation Scores of 'Overall Sample'

Descriptive Statistics			
	Mean	Std. Deviation	N
Entrepreneurial Propensity	3.6378	0.60485	250
Score on Self-gain	3.7096	0.46260	250

**Table 1** gives the mean and standard deviation scores for the overall sample of 250 students. It is interesting to observe that the averages of these domains are almost the same with greater variation on entrepreneurial propensity (EP). For self-gain (SG), the corresponding range is 2.4 to 5. Because of this, students have scored rather in the narrowed range on SG compared to the wider range on EP. The linear relationship between EP and SG is studied through a Scatter Plot, and is depicted in Fig. 1. It signifies



that higher average score on SG results in better average score on EP; and consequently, there is a positive correlation between EP and SG.



In order to measure the extent of linear relationship between the average SG scores and the average EP scores, Karl Pearson coefficient of correlation is computed; and is tested for significance.

**Table 2**  
Correlation between EP and SG of Overall Sample

		Entrepreneurial Propensity	Score on Self-gain
Entrepreneurial Propensity	Pearson Correlation	1	0.593*
	Sig. (1-tailed)	.	0.000
	N	250	250
Score on Self-gain	Pearson Correlation	0.593*	1
	Sig. (1-tailed)	0.000	.
	N	250	250

\* Significant at 0.01 level (1-tailed)

**Table 2** reveals that there is a positive correlation between EP and SG ( $r=0.593$ ,  $p=0.00$ ), and is found to be statistically highly significant. For future research, it may be suggested that the new attribute self-gain can be used to estimate EP. Since students from all major disciplines relevant for entrepreneurial career are included in the study, it reflects the importance of self-gain to measure EP.

The coefficient of determination  $R^2 = 0.351$ ,  $p=0.00$  highlights that SG contributes on EP to a large extent (**Table 3**). Hence, EP can be estimated from SG scores.

Table 3  
Coefficient of Determination between SG and EP of 'Overall Sample'

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.593a	0.351	0.349	0.48808	0.351	134.388	1	248	0.000

a. Predictors: (Constant), Score on Self-gain

The analysis of variance table (ANOVA) given in Table 4 reveals that the regression model fits well for the data ( $F=134.388$ ,  $p=0.00$ ).

Table 4  
ANOVA for 'Overall Sample'

ANOVA <sup>b</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32.015	1	32.015	134.388	0.000 <sup>a</sup>
	Residual	59.080	248	0.238		
	Total	91.095	249			

a. Predictors: (Constant), Score on Self-gain

b. Dependent Variable: Entrepreneurial Propensity

The regression coefficient and its associated test of significance are given in Table 5. The fitted regression model is as follows:

$EP = 0.762 + 0.775 SG$ . From the above regression line, we can estimate the average score on EP for a given average score on SG. Further, the population regression coefficient is different from zero as  $t=11.593$ ,  $p=0.00$ . It signifies that when the average SG score increases, the average EP score also increases proportionately.

Table 5  
Regression Coefficient and its Associated Test of Significance for 'Overall Sample'

Coefficients <sup>a</sup>								
Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	0.762	0.250	32.015	3.050	0.003	0.270	1.255
	Score on Self-gain	0.775	0.067	0.593	11.593	0.000	0.643	0.907

a. Dependent Variable: Entrepreneurial Propensity

#### Educational Status: MBA (Master of Business Administration)

Table 6 gives the mean and standard deviation scores for the 100 students belonging to MBA programme. It is interesting to note that as in the case of the overall sample, the sample comprising MBA students had their average scores on EP and SG almost the same with more variation on EP. The MBA students have scored relatively higher than the other two groups, viz., Polytechnic (PT) and Engineering (ENG) on EP as well as SG. This may be partly because of their better exposure to entrepreneurship as part of their course curriculum. MBA students are well informed about entrepreneurial opportunities, and hence better oriented towards a career in entrepreneurship. This in turn is likely to translate into a high inclination among individuals to start and operate their own businesses.

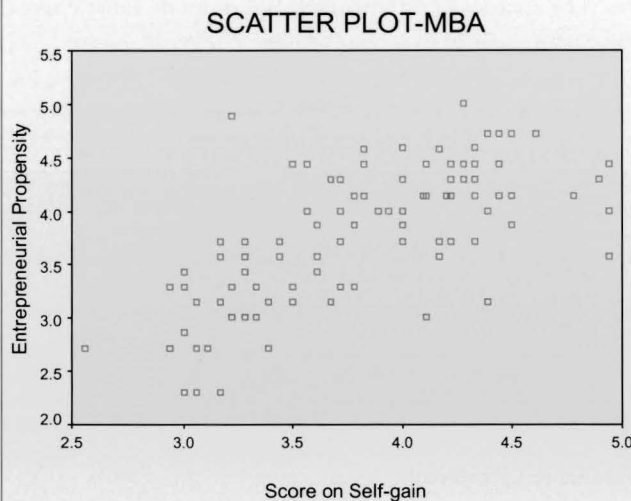
Table 6  
Mean and Standard Deviation Scores of 'MBA Sample'

Descriptive Statistics <sup>a</sup>			
	Mean	Std. Deviation	N
Entrepreneurial Propensity	3.8057	0.63015	100
Score on Self-gain	3.8250	0.54226	100

a. EDUCATIONAL STATUS = MBA

The linear relationship between EP and SG is explored through Scatter Plot. The Scatter Plot is depicted in Fig. 2. This scatter plot indicates that the higher the average score on SG, the better the average score on EP. Hence, there is a positive correlation between EP and SG.

Fig. 2 Scatter Plot for 'MBA' Sample



For the purpose of measuring the extent of linear relationship between the average SG scores and the average EP scores, Karl Pearson coefficient of correlation is computed, and tested for significance.

Table 7  
Correlation between EP and SG of MBA Sample

		Entrepreneurial Propensity	Score on Self-gain
Entrepreneurial Propensity	Pearson	1	0.663*
	Correlation		
	Sig. (1-tailed)	.	0.000
	N	100	100
Score on Self-gain	Pearson	0.663*	1
	Correlation		
	Sig. (1-tailed)	0.000	.
	N	250	250

\* Significant at 0.01 level (1-tailed)

Table 7 reveals that there is a positive correlation between EP and SG ( $r=0.663$ ,  $p=0.00$ ), and is found to be statistically significant. The coefficient of determination  $R^2$  value is mentioned in Table 8.

Table 8  
Coefficient of Determination between SG and EP of 'MBA Sample'

Model Summary <sup>b</sup>									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.663 <sup>a</sup>	0.440	0.434	0.47410	0.440	76.895	1	98	0.000

a. Predictors: (Constant), Score on Self-gain

b. EDUCATIONAL STATUS = MBA

The coefficient of determination  $R^2 = 0.440$ ,  $p=0.00$  highlights that SG contributes to EP to a large extent. Hence, EP can be estimated from SG scores. The analysis of variance ANOVA given in Table 9 reveals that the regression model fits well for the data ( $F = 76.895$ ).

Table 9  
ANOVA for 'MBA Sample'

ANOVA <sup>b,c</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.284	1	17.284	76.895	0.000 <sup>a</sup>
	Residual	22.028	98	0.225		
	Total	39.312	99			

a. Predictors: (Constant), Score on Self-gain

b. Dependent Variable: Entrepreneurial Propensity

c. EDUCATIONAL STATUS = MBA

The regression coefficient and its associated test of significance are given in Table 10. The fitted regression model is  $EP = 0.858 + 0.771 (SG)$ . From the above regression line, we can estimate the average score on EP for a given average score on SG. Also, the population regression coefficient is different from zero as  $t = 8.769$ ,  $p = 0.00$ . It signifies that when the average SG score increases, the average EP score also increases proportionately.

Table 10  
Regression Coefficient and its Associated Test of Significance for 'MBA Sample'

Coefficients <sup>a, b</sup>								
Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	0.858	0.339		2.529	0.013	0.185	1.532
	Score on Self-gain	0.771	0.088	0.663	8.769	0.000	0.596	0.945

a. Dependent Variable: Entrepreneurial Propensity

b. EDUCATIONAL STATUS = MBA

## Educational Status: Polytechnic Courses (PT)

Table 11 gives the average scores on EP and SG of 50 polytechnic students. The polytechnic students have scored lower ratings on EP and SG, but close to the ratings of engineering students and much less compared to that of MBA students. Although polytechnic is academically a lower qualification than engineering, the inclusion of a full-fledged course on entrepreneurship might have partly contributed to the relatively high scores of polytechnic students close to that of engineering students.

Table 11  
Mean and Standard Deviation Scores of 'Polytechnic Sample'

Descriptive Statistics <sup>a</sup>			
	Mean	Std. Deviation	N
Entrepreneurial Propensity	3.5146	0.56042	50
Score on Self-gain	3.5384	0.37645	50

a. EDUCATIONAL STATUS = PT

To measure the extent of linear relationship between the average SG scores and the average EP scores, Karl Pearson coefficient of correlation is computed, and is tested for significance. Table 12 reveals that there is a positive correlation between EP and SG ( $r=0.567$ ,  $p=0.000$ ), and is found to be statistically significant. For future research, it may be suggested that the new attribute self-gain can be used to estimate EP.

Table 12  
Correlation between EP and SG of 'Polytechnic Sample'

		Entrepreneurial Propensity	Score on Self-gain
Entrepreneurial Propensity	Pearson	1	0.567*
	Correlation		0.000
	Sig. (1-tailed)		
	N	50	50
Score on Self-gain	Pearson	0.567*	1
	Correlation		
	Sig. (1-tailed)	0.000	
	N	50	50

\* Significant at 0.01 level (1-tailed)

The coefficient of determination  $R^2$  is given in Table 13. The coefficient of determination  $R^2 = 0.321$ ,  $p = 0.00$  signifies that SG contributes to EP to a large extent. In the light of this, it is clear that EP scores can be estimated from SG scores.

Table 13  
Coefficient of Determination between SG and EP of 'Polytechnic Sample'

Model Summary <sup>b</sup>									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.567 <sup>a</sup>	0.321	0.307	0.46650	0.321	22.714	1	48	0.000

a. Predictors: (Constant), Score on Self-gain

b. EDUCATIONAL STATUS = PT

The analysis of variance (ANOVA) is given in Table 14. It suggests that the regression model fits the data ( $F = 22.714, p = 0.00$ ).

**Table 14**  
ANOVA for 'Polytechnic Sample'

ANOVA <sup>b,c</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.943	1	4.943	22.714	0.000 <sup>a</sup>
	Residual	10.446	48	0.218		
	Total	15.389	49			

- a. Predictors: (Constant), Score on Self-gain
- b. Dependent Variable: Entrepreneurial Propensity
- c. EDUCATIONAL STATUS = PT

The regression coefficient and its associated test of significance are given in Table 15. The fitted regression model is  $EP = 0.529 + 0.844 SG$ . From the above regression line, we can estimate the average score on EP for a given average score on SG. Furthermore, the population regression coefficient is different from zero ( $t = 4.766, p = 0.00$ ). It signifies that when the average SG score increases, the average EP score also increases proportionately.

**Table 15**  
Regression Coefficient and its Associated Test of Significance for 'Polytechnic Sample'

Coefficients <sup>a, b</sup>								
Model		Unstandardised Coefficients		Standardised Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	0.529	0.630		0.840	0.405	-0.737	1.796
	Score on Self-gain	0.844	0.177	0.567	4.766	0.000	0.488	1.200

- a. Dependent Variable : Entrepreneurial Propensity
- b. EDUCATIONAL STATUS = PT

**Educational Status: Engineering**

Table 16 gives the mean and standard deviation scores of 100 students of engineering course. The average scores obtained by engineering students for EP and SG on a scale of 5 to 1 are 3.53 and 3.68 respectively. In the case of engineering students, the variation of scores on SG is less compared to that of the variation in scores on EP.

**Table 16**  
Mean and Standard Deviation Scores of 'Engineering Sample'

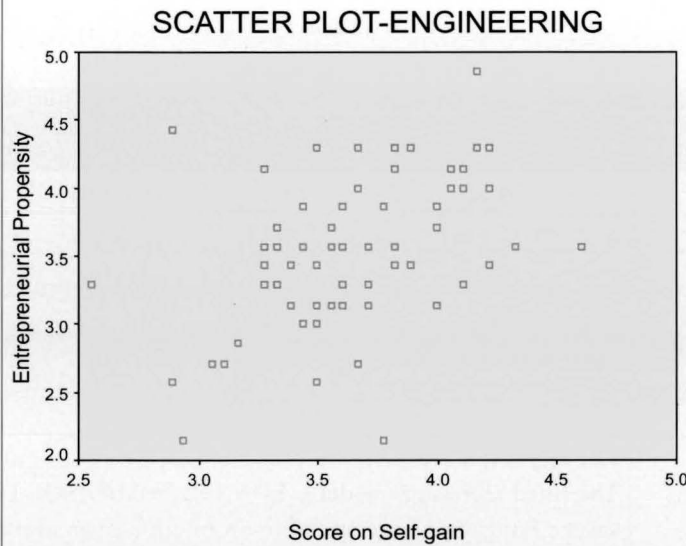
Descriptive Statistics <sup>a</sup>			
	Mean	Std. Deviation	N
Entrepreneurial Propensity	3.5316	0.56576	100
Score on Self-gain	3.6799	0.38067	100

- a. EDUCATIONAL STATUS = ENG

The linear relationship between EP and SG is studied through scatter plot, and is depicted in

Fig. 6.4. It signifies that higher average scores on SG result in better average scores on EP.

Fig. 4 Scatter Plot for Engineering Students



In order to measure the extent of relationship between the average SG scores and the average EP scores, Karl Pearson coefficient of correlation is computed, and is tested for its significance. Table 17 reveals that there is a positive correlation between EP and SG ( $r = 0.455$ ,  $p = 0.00$ ); and is found to be statistically significant.

Table 17  
Correlation between EP and SG of 'Engineering Sample'

		Entrepreneurial Propensity	Score on Self-gain
Entrepreneurial Propensity	Pearson Correlation	1	0.455*
	Sig. (1-tailed)	.	0.000
	N	100	100
Score on Self-gain	Pearson Correlation	.455*	1
	Sig. (1-tailed)	0.000	.
	N	100	100

\* Significant at 0.01 level (1-tailed)

The coefficient of determination is mentioned in Table 18. The coefficient of determination  $R^2 = 0.207$ ,  $p = 0.00$  highlights that SG contributes to EP to a large extent. Hence, EP can be estimated from SG scores.

Table 18  
Coefficient of Determination between SG and EP of 'Engineering Sample'

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.455 <sup>a</sup>	0.207	0.199	0.50630	0.207	25.615	1	98	0.000

a. Predictors: (Constant), Score on Self-gain

b. EDUCATIONAL STATUS = ENG

The analysis of variance (ANOVA) given in Table 19 reveals that the regression model fits well for the data ( $F = 25.615$ ,  $p = 0.00$ ).

**Table 19**  
ANOVA for 'Engineering Sample'

ANOVA <sup>b,c</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.566	1	6.566	25.615	0.000 <sup>a</sup>
	Residual	25.122	98	0.256		
	Total	31.688	99			

- a. Predictors: (Constant), Score on Self-gain
- b. Dependent Variable : Entrepreneurial Propensity
- c. EDUCATIONAL STATUS = ENG

The regression coefficient and its associated test of significance are given in Table 20. The fitted regression model is  $EP = 1.042 + 0.677(SG)$ . From the above regression line, we can estimate the average score on EP for a given average score on SG. Furthermore, the population regression coefficient is different from zero as  $t = 5.061$ ,  $p = 0.00$ . It signifies that when the average SG score increases, the average EP score also increases proportionately.

**Table 20**  
Regression Coefficient and its Associated Test of Significance for 'Engineering Sample'

Coefficients <sup>a, b</sup>								
Model		Unstandardised Coefficients		Standardised Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	1.042	0.495		2.107	0.038	0.061	2.023
	Score on Self-gain	0.677	0.134	0.455	5.061	0.000	0.411	0.942

- a. Dependent Variable: Entrepreneurial Propensity
- b. EDUCATIONAL STATUS = ENG

The scores of the three student groups on self-gain are given in Table 21.

**Table 21**  
Comparison of Scores of Student Group on Self-gain

	Mean	N
MBA group	3.8057	100
Polytechnic group	3.5146	50
Engineering group	3.5316	100

Based on a thorough literature review, it is found that the two most important factors influencing entrepreneurial propensity are 'tolerance for ambiguity' and 'opportunity cost'. To know how 'tolerance for ambiguity' and 'opportunity cost' influence entrepreneurial propensity in comparison with self-gain, the 'self-gain', 'tolerance for ambiguity' and 'opportunity cost' of 200 entrepreneurs were measured. For the purpose of the study, opportunity cost of the entrepreneurs was taken as the monetary gain forgone by the entrepreneurs from their next best alternative namely job for the sake of operating their



own businesses. The scores on self-gain, opportunity cost and tolerance for ambiguity are given in Table 22.

**Table 22**  
Scores of Entrepreneurs on Self-gain, Opportunity Cost and Tolerance for Ambiguity

	Mean	Median	N
Tolerance for Ambiguity (On a scale of 5 to 1)	3.2	3.5	200
Opportunity Cost (per year)	Rs 3,00,000	Rs 3,20,000	200
Self-gain (On a scale of 5 to 1)	4,795	4.8	200

It is evident from the data in Table 22 that the opportunity cost of entrepreneurs in the study is high, which shows that opportunity cost is not an important factor that contributed to the motivation to start and operate a new business by the entrepreneurs. Also, the entrepreneurs in the study had a moderate score on tolerance for ambiguity. This suggests that tolerance for ambiguity is not an important factor that motivated entrepreneurs to start and operate new businesses. In other words, other than tolerance for ambiguity and opportunity cost, there are other factors that influence the entrepreneurial propensity of individuals. It is interesting to note that the entrepreneurs scored very high score on self-gain and their answers to the open-ended questions aimed at eliciting self-gain reflect their high scores on self-gain.

## Implications of the Study

The present study has four major implications. First, entrepreneurship educators can make entrepreneurial assessment more effective by including the measurement of self-gain in the evaluation process of students. Self-gain of various students applying for entrepreneurship programmes can be measured and thus their suitability for a career in entrepreneurship can be judged with greater accuracy. This will in turn help entrepreneurship educators to design the course structure and contents of the entrepreneurship education programme. The effectiveness of entrepreneurship education is based on not only "What is taught" and "How it is taught" but also on "Who taught?". Targeting eligible and genuinely interested students has been a major challenge for entrepreneurship educators. Second venture capitalists can use self-gain in the evaluate start-up entrepreneurs. In the context of new venture creation, the assessment of founders of the new businesses is of paramount importance to VCs. Most VCs consider the quality of the team as the most important criterion for the survival of new venture. Third, researchers can find the correlation between entrepreneurial propensity and entrepreneurial potential by taking self-gain as a primary measure of entrepreneurial propensity. In other words, scores on self-gain can be used to find the correlation between entrepreneurial propensity and entrepreneurial potential. Furthermore, since self-gain is likely to be a strong indicator of an individual's willingness to start a new business, scores on self-gain can be used to find the entrepreneurial seriousness of individuals. Fourth, researchers can use the concept of self-gain to explore any contradictions of the earlier research works on entrepreneurial propensity.

Prior research on entrepreneurial propensity has relied mostly on the disciplines of Psychology and Sociology. More recently, there have been many important contributions from an economic perspective. Examples of such contributions include Baumol (1990); Gifford (1993); Douglas and Shepherd (2000). However, the author has observed the

following contradictions of the above-mentioned studies during the course of carrying out the present study:

1. Why do some individuals prefer a satisfying approach to an optimising approach in the pursuit of becoming entrepreneurs?  
or  
Why do some individuals choose to become entrepreneurs even when the other alternative (i.e. job) can provide more utility including psychological benefits?
2. Why do some individuals who have characteristics that contribute to entrepreneurial propensity as mentioned in entrepreneurship literature (like 'low opportunity cost', 'hailing from middle class family', 'coming across chance events', and 'high tolerance for ambiguity') are found not to become entrepreneurs?

On the aspect of entrepreneurial propensity, the present study does not support the economic model proposed by Douglas & Shepherd (2000) nor Grenholm et al, 2006 study for explaining the entrepreneurial propensity of individuals. The present study supports the behaviour model proposed by Evans & Leighton's 1989 study. The study also supports Robinson et al. 1991 study, which proposes the use of 'attitudes to understand entrepreneurial tendencies.

## Contribution of the Study

The contribution of the study is three-fold. First, the study has discovered a new entrepreneurial attribute called Self-gain. Second, the study provides a partial answer to the question raised in Bhide's study as to why some individuals are willing to start small and uncertain business in spite of their lack of knowledge and expertise. Third, the study advances the understanding of 'influence of attitude' on the entrepreneurial propensity of an individual, through the concept of self-gain.

## Limitations of the Study

The study explores the concept of entrepreneurial propensity through theoretical and empirical analysis and discovered a new entrepreneurial attribute called "self-gain". However, the construct of "self-gain" will help to explain entrepreneurial propensity only after a more in-depth and detailed empirical analysis. The present study has three major limitations. First, the correlation between the entrepreneurial propensity of the students (sample of 250 individuals chosen for the study) and the entrepreneurial propensity of existing entrepreneurs has not been found out in the study. Second, measuring the scores of a larger group of individuals, comprising employees, professionals, and individuals from different occupations can make the study more in-depth and detailed in nature. Third, a wider geographical coverage is needed for carrying out the research study. The present study is part of a larger research study carried out by the author on 'entrepreneurial success'. Further research using additional statistical tools and development of theoretical concepts are essential to make firm propositions about a new model that can explain entrepreneurial propensity. The present study makes one minor assumption. The sources of self-gain for all the respondents has been assumed to be the same. In reality, the respondents can have different experiences in life, family backgrounds, work/internship experience, which might influence the sources of self-gain.

## Conclusions and scope for further study

Self-gain identifies an important factor for the entrepreneurial propensity of individuals. Self-gain gives only a partial answer to the question as to why individuals are willing to start uncertain and new businesses. The construct of self-gain highlights the attitude and preferences of individuals who are highly inclined to start uncertain and new businesses. Self-gain can be an important construct in the context of exploring entrepreneurial propensity. The author concludes that self-gain contributes to entrepreneurial propensity and provides a possible answer to the mystery behind entrepreneurial propensity of individuals. The present study offers a lot of scope for further study in two major areas:

- (i) The entrepreneurial propensity of individuals who have undergone entrepreneurship education or training.
- (ii) To find the correlation between entrepreneurial propensity and entrepreneurial potential. This raises three questions. First, do individuals who possess a high entrepreneurial propensity have a high entrepreneurial potential after receiving entrepreneurship education or training? Second, does the impact of team formation play a role in developing entrepreneurial propensity among individuals? Three, does entrepreneurial propensity of an individual increase or decrease with the age of the individual?

## References

- Baumol, W.J, 1990, 'Entrepreneurs: Productive, Unproductive and Destructive', *Journal of Political Economy*, Vol. 98, No. 5, pp. 893-921.
- Bhide, Amar V, 2000, *The Origin and Evolution of New Businesses*, New York, Oxford University Press.
- Campbell, C.A, 1992 'A Decision Theory Model for Entrepreneurial Acts', *Entrepreneurship Theory and Practice*, Vol. 17, September, pp. 21-27.
- Casson 1982, *The Entrepreneur: An Economic Theory*, Totowa, NJ, Barnes and Noble.
- Colin Dunn, 2004, 'Background of Nascent Entrepreneurs', submitted at the International Council for Small Businesses at Johannesburg (South Africa) during June 20-23, 2004.
- Dooley A. 1983, "The Explosion of Interest in Entrepreneurship: Concern in the Midst of Celebration", in J.J. Dao and Howard H. Stevenson, eds. *Entrepreneurship: What it is and How to teach it*. Boston: Harvard Business School.
- Douglas, E.J. & Dean A. Shepherd 2000, 'Entrepreneurship as a Utility Maximising Response', *Journal of Business Venturing*, Vol. 15, No. 3, pp.231-251.
- Evan Douglas, 1995, 'Entrepreneurial Capital and Entrepreneurial Intention', *Conference Proceedings*, <http://www.babson.edu>. Last accessed on October 26, 2009.
- Evans, D.S. & L.S. Leighton 1989, 'Some Empirical Aspects of Entrepreneurship', *American Economic Review*, Vol. 79, pp. 519-539.
- Gifford, S, 1993, "Heterogeneous Ability, Career Choice, and Firm Size", *Small Business Economics*, pp. 249-259.



Gilad, B. and P. Levine, 1986, 'A Behavioural Model of Entrepreneurial Supply', *Journal of Small Business Management*, Vol. 24, No. 4, pp. 45 -54.

Grenholm et al., 2006, "What Motivates Entrepreneurs? Can their Motivation be Influenced?", *The ICFAI Journal of Entrepreneurship Development*, Vol. 3, No. 2, June, pp. 9-24.

McClelland, David C, 1961, *The Achieving Society*, New York, The Free Press.

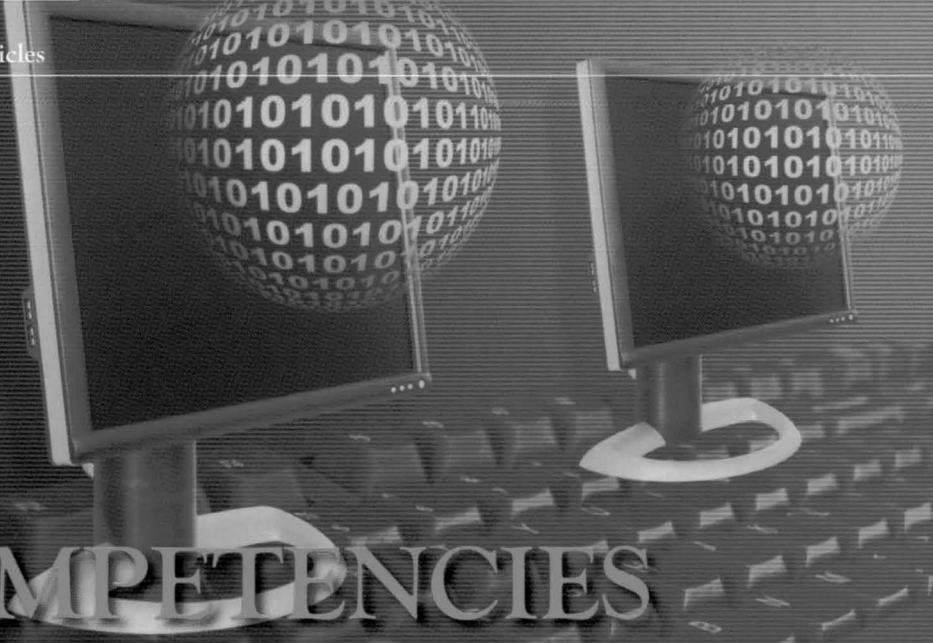
McCormack, Mark H, 1986, *What they don't teach you at Harvard Business School*, New York, Bantam Books.

Miner, John B, 1990, *The Four Routes to Entrepreneurial Success*, San Francisco Berrett-Koehler Publishers, Inc.

Panda, Tapan K. and S. Panda , 2005, 'Studying Entrepreneurial Seriousness amid Small Businesses of Orissa', *The ICFAI Journal of Entrepreneurship Development*, Vol. 2, No. 4, December, pp. 10-21.

Robinson et al. (1991) 'An attitudinal approach to the prediction as a Utility Maximising Response associated with performance in entrepreneurial firms and smaller businesses', *Journal of Business Venturing*, Vol. 6, No.1, pp. 79-93.

Shaver, K.G. and L.R. Scott, 1991, 'Person, Process, Choice: The Psychology of New Venture Creation', *Entrepreneurship Theory and Practice*, Vol. 16, No. 2, pp. 23-45. **F**



# COMPETENCIES NECESSARY FOR MANAGING TECHNOCHANGES

By Dr. A. Satya Nandini and Lalitha S. M

## Abstract

Technology is one of the main enablers of change within organisations. In this context, “Technochange” refers to organisational changes driven by technology. The technochange has impacted the IT industry as well as non-IT industry. Technochange management has become a hot topic today due to big transformational projects undertaken, organisational restructuring, migration to new technologies, mergers & acquisitions, etc. Research indicates that 80% of the technochange initiatives fail to achieve the desired outcomes. There are multiple reasons why a technochange could fail, but the failure could lead to project risks and cost overruns in most of the cases. Technochange managers manage mostly such technochange projects. The technochange manager’s capabilities and skill sets have a major impact on the success of the project. Managing such technochange projects not only requires technical skills but also the capability to manage organisational change. This paper discusses the competencies required by technochange managers to carry out such projects and ensure success. A survey-based method was used to collect opinion from experienced project managers, change managers and consultants on competencies required to manage technochanges. The information collected from 145 respondents with five and more years of project management and change management experience, was analysed to yield 14 competencies necessary for managing the technochanges effectively. Important contributions of this study include: (a) Reporting on technochange manager competencies required to manage technochange projects and ensure that they are executed successfully to reap the expected results; (b) The set of identified competencies can be used by organisations to enable competency mapping; (c) Gap analysis can be carried out on the existing competency and the desired competency. Based on the outcome, the relevant training plan can be devised. This will also enable organisations to choose the right candidate and deploy them for technochange projects.

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## Introduction

There are many factors that drive the organisational change. Technology is one of the main enablers of change within the organisations. Most of the change programmes are circled around the technology factor. Many businesses are compelled to upgrade the technology because of various factors, e.g, current technology is obsolete and end of the support life cycle, periodical technical refresh, implementing new software and products, mergers & acquisitions, etc. Technology change is intended to improve the ways of working. Businesses are forced to constantly review the existing technology and strategise the need to implement newer technologies.

In this context, “Technochange” refers to organisational changes driven by technology. The technochange has affected IT industry as well as non-IT industry. The implementation of large-scale information systems like Enterprise Resource Planning (ERP) systems, Customer Relationship Management (CRM) systems and Supply Chain Management (SCM) systems, are some examples of IT-driven technochanges that have gained momentum in various kinds of organisations.

Technochange management has become the hot topic today due to big transformational projects undertaken, organisational restructuring, migration to new technologies, mergers & acquisitions, etc. Quiet often, organisations are facing challenges due to a new technology initiative, which do not gain the expected acceptance. Research indicates 80% of the technochange initiatives fail to achieve the desired outcomes. Experiences show that, in managing large technological transformation programmes, implementing technochange is a complex task. Technochange failure could lead to project risks and cost overruns in most of the cases. The hurdle for any such programmes could be in the form of unexpected changes in the external conditions, a lack of commitment in implementation, resistance of people involved, or a lack of resources.

Change managers manage such technochange projects. The overall success of any such project depends on the capability of the change manager to execute the project. Considering all the issues and risk factors involved with technochange projects, the change manager’s capabilities have a major impact on the success of the programme. Managing such technochange projects not only requires technical skills but also personal and business skills. Therefore, it is inevitable that a change manager is equipped with the essential competencies to manage large-scale technochange programmes successfully. This definitely calls for analysing what competencies are required today to manage the technochange programmes successfully.

This paper identifies and discusses the competencies that technochange managers require to implement the projects and ensure success. The past studies, surveys and interviews with practitioners were used in the research to identify a set of essential competencies required for managing technology change. The results of the research are presented in this paper.

## Challenges Involved in Technochange Programmes

Implementing a new technology is not a simple task and may involve changes to the existing processes, ways of working, organisational structures, etc. Such technochanges are a complex process involving user community, key stakeholders, project team, technologists and IT implementation team. Therefore, implementing a new system not only involves the technical component but also the organisational trajectory and is intended to have impact on the cost and organisational performance.

Today’s technological changes are tangled with globally varied groups, different cultures, interests, requirements, etc. There are various challenges in executing a technochange within an organisation, because technology-based changes affect the interfaces among the multiple units within an organisation and other organisations linked for a business purpose. Some of the common challenges faced by organisations during any technology transformation projects are listed below:

- When the team is globally spread across, coordination becomes a big challenge.
- Cultural issues become predominant and have to be managed.
- Tight timelines and budget committed by leadership team

- When the organisation has multiple business units, the challenge is to understand the processes and standards across business units and disparities between them. It is not only very important to understand the requirements of each unit but also to find out as to how best our solution meets their requirements.
- Non-uniform IT systems
- A mix of systems, processes and methodologies that must be consolidated to streamline operations
- Non-availability of resources to take on the roles and responsibilities and deliver it on time
- Need for collaborative management of technology programmes
- Dependency on various teams for tools, training and communication

Markus (2004) in his study “Technochange management: Using IT to drive organizational Change” suggests that technochanges vary from IT projects and organisational change programmes (Refer Table 2), and their design and implementation should be dealt with in a different manner. Markus suggests that technochange managers should develop the competencies necessary to succeed managing such projects successfully. Keeping all these in mind, it is essential that such projects be handled by technochange managers who can not only appreciate the technology but also understand the varied business interests and components affecting the project. They should be able to perform the project management tasks plus also take into consideration the organisational change aspects, and strategise as to how to proceed at each milestone to achieve the desired objectives. According to Prosci 2010 research, there are various costs and risks associated with complex environment of organisations as listed in Table 1.

**Table 1**  
Costs and Risks

	Costs	Risks
To the project if we do not manage the people side of this change well	<ul style="list-style-type: none"> <li>➤ Project delays</li> <li>➤ Missed milestones</li> <li>➤ Budget overruns</li> <li>➤ Rework required on design</li> <li>➤ Loss of work by project team</li> </ul>	<ul style="list-style-type: none"> <li>➤ Resistance</li> <li>➤ Project put on hold</li> <li>➤ Resources not made available</li> <li>➤ Obstacles appear unexpectedly</li> <li>➤ Project fails to deliver results</li> <li>➤ Project is fully abandoned</li> </ul>
To the organisation if we do not manage the people side of this change well	<ul style="list-style-type: none"> <li>➤ Productivity plunges</li> <li>➤ Loss of valued employees</li> <li>➤ Reduced quality of work</li> </ul>	<ul style="list-style-type: none"> <li>➤ Impact on customers</li> <li>➤ Impact on suppliers</li> <li>➤ Morale declines</li> <li>➤ Legacy of failed change</li> <li>➤ Stress, confusion, fatigue</li> <li>➤ Change saturation</li> </ul>
To the organisation if this change does not deliver the results we expect	<ul style="list-style-type: none"> <li>➤ Lost investment made in the project</li> <li>➤ Lost opportunity to have invested in other projects</li> </ul>	<ul style="list-style-type: none"> <li>➤ Expenses not reduced</li> <li>➤ Efficiencies not gained</li> <li>➤ Revenue not increased</li> <li>➤ Market share not captured</li> <li>➤ Waste not reduced</li> <li>➤ Regulations not met</li> </ul>

Source Prosci 2010 study

Table 2: Technochange vs IT Projects and Organisational Change Programmes (Based on Markus, 2004)

	IT Projects	Organisational Change Programmes	Technochange Projects
Target outcomes	Technology performance within time and budget	Improved organisational performance	Improvement in organisational performance, enabled and facilitated by new IT
Solution	New IT	Interventions focussed on people, structure and culture	New IT in conjunction with complementary organisational change
Approach	Project manager who is expected to produce a working system that meets stated specifications on time and within budget	Changes in processes, structures, job redesign, etc.	A programme of change, including new IT but in combination with coherent changes in processes, job redesign, structures, etc.
Key Success factors	Project manager performance, technology performance, vendor performance	Performance of organisational managers, performance of internal and external organisational change consultants	Performance of organisational managers, performance of internal and external organisational change consultants; project manager performance, technology performance, vendor performance; tight ongoing coordination between people involved in the organisational change programme and the IT project

## Review of Literature

In technochange projects, the promoter either tends to focus completely on the IT aspects or the organisational aspects which often leads to complexity and eventually failure of such projects. Yeo (2002) indicates in the study “Critical failure factors in information system projects”, that these can easily lead to project failure. He suggests three factors that often lead to project failure: process-driven issues (related to project planning and management), context-driven issues (related to strategy, culture and politics) and content-driven issues (related to software, hardware and IT professionals). Technochange managers who mainly focus on the IT issues of technochange often fail to recognise the context-driven issues, such as business benefits. They tend to be completely taken by the implementation problems and undesirable organisational consequences. They believe that IT alone is enough to create improvements in the organisational performance. However, change managers who mainly focus on the organisational issues of technochange are often unaware of the opportunities that IT offers, depending too much on IT experts, including IT vendors with commercial interests. They tend to base the change interventions exclusively on people, structure, culture and human resource policies without using information technology as an effective enabler of organisational change.

Dr. Ehsan N, Waheed K.Z, Asghar U, Nawaz M.T, Mirza E, Sarwar S.Z (2010, pp 107-112) in their study “Effects of Project Manager’s Competency on Project Success”, concludes that the project manager’s knowledge areas play a vital role in the successes or failure of projects and an experienced project manager will possess particular uniqueness that will enhance the team performance and his planning based on his project management skills.



Hirschheim, Klein, and Lyytinen (1995, pp 231–233) in their study “Information systems development and data modelling” argue that technochange projects that are particularly based on data modelling and new architectures are internally complex. If these projects are not sufficiently integrated into the organisational and operational processes or explicit implementation guidelines, they may fail.

Markus in his study “Technochange management: Using IT to drive organizational change” also suggests that technochange managers should develop the competencies necessary to succeed managing such technochange projects successfully. Although Markus provides a detailed account of the impact of technochanges on organisations and the components involved throughout the change process, the study does not indicate the competencies required to execute technochange projects successfully. Markus’s study is not explicit about the particular competencies that technochange managers should possess to execute their projects successfully. They also tend to ignore the opportunities to benefit from the IT-enabled organisational performance improvements (Markus, 2004).

Elad Harision and Albert Boonstra (2009) on “Essential competencies for technochange managers” discuss in their paper on competencies required by managers to carry out these technochanges effectively. The research and case study indicate the importance for technochange managers to have inter-personal competencies and communication skills. Interestingly, the case study suggests that for project leaders, IT and technical skills are of less importance and that in many cases they can be replaced by the expertise of team members. Communication skills and their development (both verbal and writing skills) as well as leadership and process management competencies are, among others, considered as far more important for a successful completion of technochange projects than technical skills.

In most cases, technochanges are essential for the organisation’s survival, as they are a response to new technologies, markets and other challenges in the business environment (Bennis, 1969, p. 2). This insight implies the involvement of employees or consultants in diagnosing problems, examining and selecting solutions, identifying change-objects, implementing the changes planned and evaluating the results. The major competencies needed for accomplishing organisational change interventions may vary with each project and largely depend on the characteristics of the organisation in which the changes are taking place. Literature on change management by Cummings & Worley in 2005, “Organization development and change” suggests that the particular personal and professional attributes of change managers and consultants are pivotal for a successful completion of the organisational processes. Kendra and Taplin in their study in 2004 on “Project success: A cultural framework.” suggest that the success of IT projects coincides with the ability of project managers to act as change agents. A change agent is defined as a person who is responsible for initiating, managing and sustaining the efforts to realise the change required. Therefore, in their capacity as change agents, managers can support the organisation’s development as well as the organisational change interventions. These interventions vary in nature and can be directed at human processes, techno structure, human resources management, and strategy (Cummings & Worley, 2005) and may affect individuals, groups, as well as organisations as a whole. In order to improve the employees’ adaptation to the technochanges, strategies that are aimed at transforming the common organisational beliefs, attitudes, values and structures within the organisation are required.

## Theoretical Background

Competency is defined as a combination of knowledge, skills and behaviour used to improve performance; or as the state or quality of being adequately or well qualified, having the ability to perform a specific role to improve the organisational performance. Competencies impact the way in which the technical knowledge is utilised to improve the ways of working and hence influencing the organisational efficiency to achieve the desired goals. The competencies required to manage technochange programmes depend on the nature of project, as each project is different and the desired outcome of each project varies.

**According to Prosci, five reasons why it is essential to build the competency to manage changes are:**

1. To build competitive advantage
2. Because of failed changes in the past, organisations may want to build the competency to manage future changes effectively.
3. To be prepared to meet and execute the upcoming changes successfully
4. Consistently apply the approach to each and every change so that the value is magnified
5. To build individual organisational change management competency, which is an important skill set that leaders, managers and supervisors throughout the organisation need to add to their portfolio.

According to some definitions, the term 'Technochange management skills and competency' refers to an individual's ability to successfully manage the IT project, people, teams, resources, processes, costs and risks through a period of change in a proactive and structured manner. Therefore, technochange managers must be able to objectively analyse all aspects of change, and be able to predict and plan for the effects of change. An effective technochange manager should be able to implement a new company-wide process or technology with minimal disruption to daily operations and to meet the desired project results by maintaining the stakeholder expectations.

Markus suggests several ways to manage scenarios of technochange effectively by focussing on processes as well as on products, by applying incremental change through technochange prototyping and by searching for alignment and coherence among the different processes. In particular, she argues that successfully accomplished technochanges involve reaching a balance between radical design and incremental implementation. Markus also suggests that technochange managers should incorporate the competencies necessary to succeed in accomplishing their goals. Therefore, they should be able to "initiate the project, to act as sponsors and champions of change, to explore process options enabled by the new technology, to design and implement non-technology changes, to change their own management systems and behaviours as required to ensure benefit, to provide key design inputs and oversight for the IT project." (Markus, 2004, p.7).

## Methodology

The study has adopted a qualitative approach, conscientiously combining an in-depth review of literature, survey, and interview with large number of experts. This study is of importance on both theoretical and practical grounds. Previous studies particularly have

focussed on the organisational aspects of technochange throughout the process of IT implementation, and on its impact on the organisation after its completion. However, there is no mention of the competencies required to execute such projects successfully. This study validates the existing list of competencies, identifies the additional ones, defines and describes the variety of competencies that are essential to manage technochange projects.

During the first stage, list of competencies and skill sets were identified by extensive review of literature. This list was prepared to primarily undertake the technochange projects. Table 3 in Analysis provides the resulting categorisation of competencies required to manage technochanges. This provides the initial inputs for the following stages of our study. In the next stage, this list was shared through a survey carried out with change managers, project managers and consultants. The survey was shared with 145 managers working for various technochange projects with five and more years of experience in a similar field. The respondents were asked the following key questions:

1. Are the previously identified skill sets and competencies essential to manage change projects?
2. Should the competencies be retained and prioritised?
3. What other skill sets should be added to the existing list of competencies?

## Limitations of the Study

Due to methodological and measurement problems, other aspects relevant for the research, such as assumed norms, values and beliefs, were not included in the study.

## Analysis

The study conducted by Elad Harision and Albert Boonstra gave the coherent picture of the taxonomy of competencies related to technochange processes. Moreover, based on this taxonomy, their study further validated the set of competencies required to manage technochanges and describes each dimension. Their study lists eight primary dimensions that are necessary in the context of technochange programmes. The assessment dimensions are captured in Table 3.

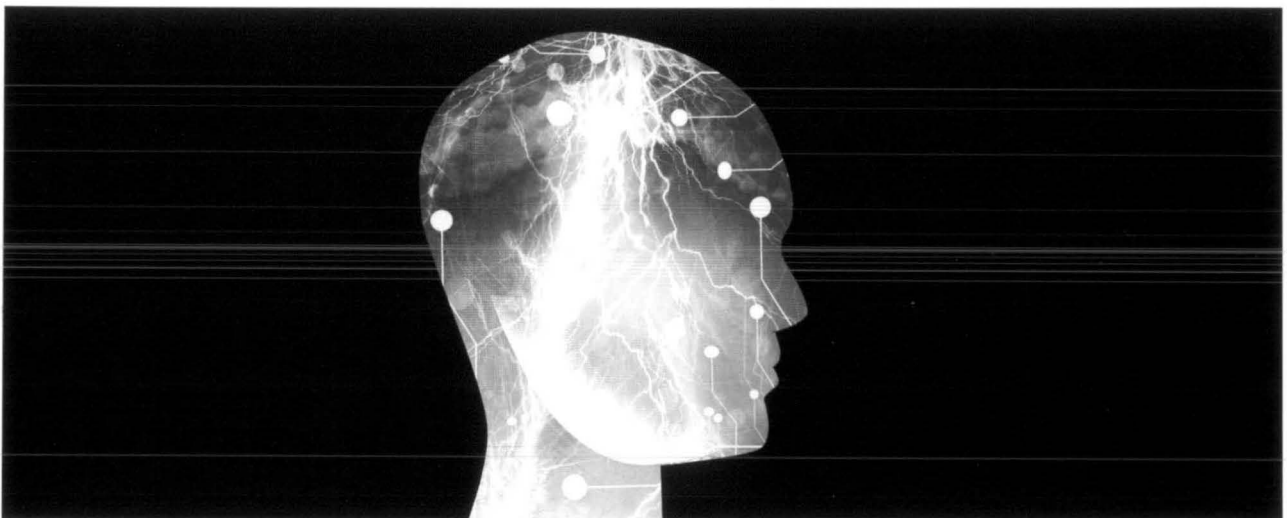


Table 3  
Essential Competencies for Technochange Management

Dimensions	Description
Information technology and information systems know-how	Actual knowledge of the IS/IT field (at a level of higher education) and experience in IS/IT projects in leading and responsible positions.
Organisational change	Knowledge of the fields of organisational change and organisational development (at a level of higher education). Experience in organisational change and organisational development projects, including managing, leading and operative issues. The ability to understand organisations and their work processes in their specific contexts.
Technochange	Knowledge of IT-related organisational change processes. Clear insights into the implications of such changes for organisations. Experience in technochange projects in terms of managing, leading and fulfilling operative functions.
Risks and success factors of technochanges	Insights into risks and success factors that closely affect the technochange processes. Experience in dealing with these factors in technochange projects.
Communication	Skills and experience in verbal and intermediary communication, such as conducting interviews, writing reports, presentations, listening, motivating and convincing.
Process management	Skills and experience in planning, managing and evaluating IT-related organisational changes.
Leadership	Experience in directing and leading IT-projects and organisational change. The ability to provide instruction, facilitate and advise management and project employees. Personal skills are empathy, diplomacy and an understanding of organisational politics.
Consequences of change	The ability to recognise and anticipate the results of the technochange programmes and their impact on organisations, their performance and work processes.

Source: Towards an assessment model by Elad Harison and Albert Boonstra (2009)

Based on literature review and interactions with practitioners, a broad spectrum of technochange management capabilities were found to exist across organisations and organisation's competency levels. They are Functional Competency, Business Competency and Personal Competency. The identified skills were then grouped together under these three competency categories:

1. **Functional Competencies** – Technical competencies that are job-specific that drive high performance and quality results for a given project (Refer to Table 4).
2. **Business Competencies** – Perspectives and skills relating to understanding internal and external business contexts. Critical skills that enable technochange managers to link any given project to the relationships, resources, and infrastructure of their organisation (Refer to Table 5).
3. **Personal Competencies** – They form the individual attributes, values and characteristics that underlie a person's ability to successfully manage a project (Refer to Table 6).

Table 4

Functional Competency	
Competency	Description
Technochange	Ability to oversee IT applications in conjunction with complementary organisational change
Project Management	Knowledge and experience that facilitate effective project management
IT Knowledge	Insight into new IT applications and system development processes

Table 5

Business Competency	
Competency	Description
Business insight, change implementation and management	Change implementation planning and management
	Organisation design and implementation
	Risk and benefits management - Understanding the crucial success factors of change: completeness, implementability, appropriateness of benefits; Ability to oversee and anticipate the consequences of change.
Organisational change	Understanding the mechanics of the organisation, Business Acumen-Business Awareness and Business Operations Knowledge to understand issues relevant to the business and the larger business framework within which project management responsibilities lie
	Ability to see the possibilities of "what can be", engaging stakeholders to develop a shared view and plan of action, and orchestrating resources, requirements and interdependencies to successfully deliver the project.
	Insight in general nature of change
Relationship management	Effective individual response to change
	Insight into human aspects of project management
	Stakeholder identification and relationship management, client relationship management

Table 6

Personal Competency	
Competency	Description
Communication	Interviewing, speaking, listening, writing-presentation skills
	Articulate business case
	Organisational communications
Leadership	Planning and evaluating change
	Project manager as a facilitator and a team builder
	Managing, patience, leadership, sensitivity
	Diplomacy, empathy, politics
	Ability to interact with senior management
	Co-operation, leading teams, teamwork and cooperation

Table 6 Contd....

Personal Competency	
Competency	Description
	Influencing skills
	Positive attitude and commitment, the essentials for embracing, not just coping with change. Self-control, Self confidence, Flexibility, and Organisational commitment to align one's own behaviour with the needs, priorities, and goals of the organisation.
	Negotiation, Conflict Management, Delegation
Cultural Understanding	Cultural understanding is key for change management in globalised world
Emotional Balance	Ability to manage one's emotions despite adversities and to influence others
Decisiveness	Ability to take a decision quickly and effectively
Analytical Ability	Ability to read a situation, ability to interpret, ability to diagnose and suggest solutions
Ownership	Takes personal responsibility for the work and the outcomes
Goal-orientation	Ability to define and focus on goals

## Statistical Data



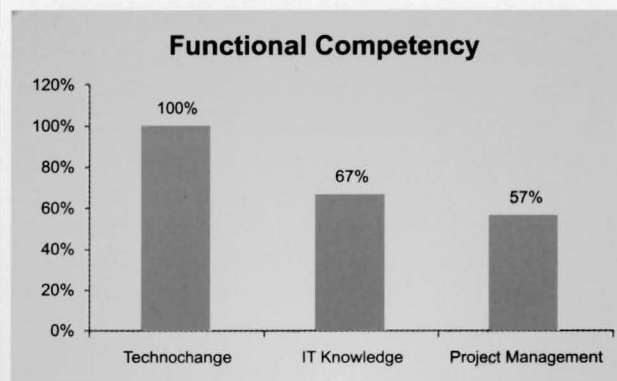
Frequency distributions were obtained for all individual data of the respondents. The frequencies based upon age, sex, experience and profession is as shown in Table 7. Maximum number of respondents was in the age group 30-35 years (47%). Large number of respondents were males i.e; 112 (77%). Bulk of them belonged to the experience range of 5-10 years (54%) and majority of them constituted project managers by profession, i.e, 63 (43%).

Table 7

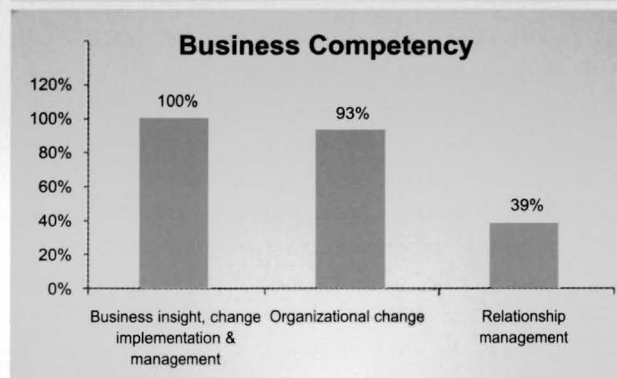
Respondent Profile			
N=145		Count	Column (%)
Age	Under 30	33	23%
	30 to 35	68	47%
	36 to 40	28	19%
	Over 41	16	11%
Sex	Male	112	77%
	Female	33	23%
Experience	5 to 10 years	78	54%
	11 to 15 years	47	32%
	Over 15 years	20	14%
Profession	Change Managers	47	32%
	Project Managers	63	43%
	Consultants	35	24%

The frequencies of functional competency, business competency and personal competency are given in Figures 8, 9 and 10, respectively. Under the functional competency group, all respondents voted for technochange competency, which enables the understanding of IT applications in combination with organisational change. Likewise, under the business competency group, business insight, change implementation & management skill has

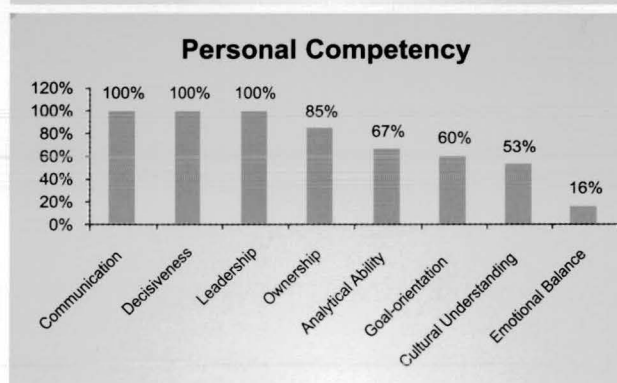
obtained 100% consensus from the respondents. This skill deals with change planning and execution which results in realising the project benefits. In this group, relationship management has emerged as the new skill set with 39% of respondents mentioning this as an important skill to identify and involve the right stakeholders to make decisions that lead to change success. Predominantly, this will help to effectively manage the stakeholder expectations and thereby minimising the anxiety, uncertainty and resistance. Amongst the personal competencies, communication, decisiveness and leadership have the agreement from all respondents. Leadership is clearly the most important determinant of getting through the technochange and communication forms an integral part of leadership and change management to ensure the successful implementation of the technochange. Demonstration of leadership competency during change is based on sound decisions being made. Ability to understand a situation, analyse the alternatives and expertise to decide on the best solution is very important during the change lifecycle. With 53% of the respondents vouching for the “cultural understanding”, has emerged as the key competency for change management as this ensures the culture differences are accounted during the change period.



Figures 8



Figures 9



Figures 10

## Findings

Based on the feedback received through survey mechanism and discussions with the respondents, some key points that emerged out of this study are given as follows:

1. It is very clear that for a technochange project, in-depth knowledge of technology is not essential as the knowledge of the team member and experts in the organisation can substitute the same. However, as a technochange agent, it is very important to be able to understand the high-level overview of the architecture and technical landscape. Functional competency will help them to analyse how their decisions will affect other systems in the landscape and help them to make right decisions. Under this competency category, the most important one is the ability to oversee the IT applications in parallel with the complimentary organisational change components. Though they are not expected to know the technology in depth, this competency will enable them to interact with various teams and specialists on the subject confidently and provide their recommendations.
2. Business competency will help the technochange managers to understand the dynamics of the organisation. This will be handy to identify all the critical elements in an organisation that is impacted by the project. Therefore, he can identify and involve the right resources to tackle the gaps and minimise the disruptions. Under this category of competencies, relationship management has drawn the focus in our study. It means that identifying the right stakeholders and relationship management can help in the long run to achieve the desired results and to get the necessary support to implement our decisions. Predominantly, this will help to effectively manage the stakeholder expectations, thereby minimising the anxiety, uncertainty and resistance.
3. Personal competencies are the ones that keep the technochange managers focussed, make right decisions and do the balancing act. It will enable him to create the right environment, which is conducive for performance. Predominantly, every respondent has vouched for "effective communication" as the critical competency to manage the projects successfully. Eventually, this will drive all the impacted staff to feel that their concerns are being heard and they are also responsible for the project outcomes without being made to feel coerced. In addition, amongst the personal competencies, two new skills that have drawn our attention are "articulate business case" as an important communication skill and "cultural understanding" as a critical skill set. Ability to understand the culture differences and to suit the needs of the hour is emerged as the key competency for change management in the globalised world.

## Key Contributions of the Study

Important contributions of this study include:

1. Reporting on technochange competencies required to manage technochange projects and ensure they are executed successfully to reap the expected results.
2. The set of identified competencies can be used by organisations to enable competency mapping.
3. Gap analysis can be carried out on the existing competency and the desired competency. Based on the outcome, the relevant training plan can be devised. This



will also enable organisations to choose the right candidate and deploy them for technochange projects.

## Conclusions

Due to the dynamics in the external environment, many organisations find themselves in nearly continuous technochange. The scope reaches from smaller technochange projects in particular sub-business units up to corporation-wide transformation processes. Unfortunately, not every technochange process leads to the expected results. There are multiple reasons for potential failure: Typical barriers to technochange are a lack of commitment in implementation, resistance of people involved, or a lack of resources, tight budget and timelines. The implications of failed technochange projects go beyond missed objectives. In the light of the many problems and risks associated with technochange projects, the technochange agent has a very important function. The technochange agent's capabilities have a major impact on success or failure of the project, and on the extent of potential unwanted side effects.

Therefore, in organisations across the world, it has become evident that there is a need to build the competency to manage technochange programmes. Building the competency, sets the organisations apart and helps to ensure that the objectives are achieved. It allows you to minimise the disruptions and negative consequences and helps to position the organisations better to take up the challenges and be prepared for the future initiatives and ensure success. These competencies help the organisations to build competitive advantage so that the same can be utilised to every change and magnify the value. From individual perspective, the technochange competencies are very important skill set, that leaders, managers and supervisors throughout the organisation can add to their portfolio.

According to the mapping done in this study, functional competencies are job-specific that drive high performance and quality results for a given project. Under this competency category, the most important one is the ability to oversee the IT applications in parallel with the complimentary organisational change components. This will help them to analyse as to how their decisions will impact other systems in the landscape and help them to make right decisions.

Business competency will help the technochange managers to understand the dynamics of the organisation. It will be handy to identify all the critical elements in an organisation that are impacted by the project. Relationship management has drawn the focus in our study. Predominantly, it will help to effectively manage the stakeholder expectations and thereby minimise the anxiety, uncertainty and resistance.

Personal competencies are the ones that keep the technochange managers to be focussed, make right decisions and do the balancing act. It will enable him to create the right environment that is conducive for performance. Apart from communication skills, the study has identified two new skills "articulate business case" and "cultural understanding" as critical skill sets. Ability to understand the cultural differences and to suit the need of the hour emerged as the key competency for change management in the globalised world.

## References

1. Bennis, W. (1969). *Organization development: Its nature, origins, and prospects*. Reading, MA: Addison-Wesley
2. Cummings, T.G & Worley, C.G (2005), *Organization development and change*
3. Ehsan N, Waheed K.Z, Asghar U, Nawaz M.T, Mirza E, Sarwar S.Z, "Effects of Project Manager's Competency on Project Success", *Management of Innovation and Technology (ICMIT)*, 2010 IEEE International Conference on 2-5 June 2010
4. Elad Harison, Albert Boonstra, *Essential competencies for technochange management: Towards an assessment model*, *International Journal of Information Management* 29 (2009) 283-294
5. Hirschheim, R, Klein, H.K, & Lyytinen, K (1995), *Information systems development and data modelling*. Cambridge: Cambridge University Press
6. Kendra K, & Taplin, L.J (2004), *Project success: A cultural framework*, *Project Management Journal*, 35(1), 30-45
7. Markus M.L (2004), *Technochange management: using IT to drive organizational change*, *Journal of Information Technology* (2004) 19, 4-20
8. Prosci's "The need for Enterprise Change Management (ECM) ~ or ~ Why build the competency to manage change" through <http://www.change-management.com/tutorial-why-ecm.htm>
9. Yeo, K. T (2002), *Critical failure factors in information system projects*. *International Journal of Project Management*, 20(3), 241-246. ❶