

# **The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective**

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## **Abstract**

Despite the fact that a “growing level of per capita income” has been identified as a major driving force of the rate of innovative start-ups (Wennekers, Stel, Carree and Thurik, 2010), the steady rise in per capita income in Sri Lanka and the lucrative opportunities afforded by the **ICT revolution**, have not been reflected in the number of IT start-ups in the country. This research attempts to study student inclination towards entrepreneurship in information technology in the wake of the underlying economic growth in Sri Lanka, post-civil war. The research was predominantly a quantitative study, based on a sample of 300, drawn from eight institutes offering undergraduate courses in IT. The findings led to the conclusion that the entrepreneurial intent level of the said population is significantly influenced by contextual factors comprising university support and role model influence, both directly and indirectly (through the mediating effects of favourable personal attitude and significant self-efficacy). The study suggests efforts to increase the entrepreneurial intent of IT undergraduates, who must strive to enhance the perceptual elements comprising personal attitude and self-efficacy, through those factors known to affect them: university support measures and role model influence.

**Key words:** Information Technology, Contextual Factors, Sri Lankan Undergraduates, Entrepreneurial Intent.

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## **The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective**

### **Introduction**

Entrepreneurial firms in the IT industry stand to benefit from the opportunities that rapid technological advances and short product life cycles may offer: the low entry barriers which may be exploited by smaller ventures; the frequency with which the introduction of new technology takes place; the easy convergence of the diverse markets that the IT industry offers; and the communication infrastructure support derived from the government (Yang, Lee and Lee, 2013). Yet, there are surprisingly few (approximately 300 registered) IT companies in the country when considering the relatively large number of high quality IT graduates (approximately 5500) joining the workforce annually (Kearney, 2012). Given this disparity and the pivotal role of entrepreneurship in accelerating economic development, the researchers believe that there should be a greater emergent IT entrepreneurial student population in the country.

Having achieved accelerated growth rates since the end of its civil war in 2009, Sri Lanka has registered its highest growth of economic development since independence, with the economy of 2011 growing at a rate of 8.3 percent in comparison with the 8.0 percent growth recorded in 2010, and the per capita income increasing to US dollars 2836 from US dollars 2400 in the preceding year (Department of Census and Statistics, as reported in the Sunday Leader, April 8, 2012). World Bank sources indicate that the current proportion of the services sector (to which information technology makes a substantial contribution) in the economy is significant even by South Asian standards, with over 60% of the real GDP growth recorded from the year 2000 to date, being accounted for by the growth in the services sector, raising it to a level more comparable to the structure of economic growth in OECD countries rather than that of other developing nations (Dutz and O'Connell, 2013).

Notwithstanding the fact that a "growing level of per capita income" has been identified as a major driving force of the rate of innovative start-ups (Wennekers et al., 2010), there has been no evidence of this being reflected in the number of IT start-ups in Sri Lanka. This has been attributed to factors such as the opportunity cost of self-employment being high, on account of the salaries in the industry being maintained at high levels (Perera, 2011); the stream of earnings from self-employment being less secure due to inherent risks (Kangasharju and Pekkala, 2002, as cited by Wu and Wu, 2008); the prevalent culture, with predominantly feminine values, high power-distance and uncertainty avoidance on scales delineated by Hofstede

(1983), as cited by Liyanage, (1996); the social identity being increasingly defined in terms of lifestyle rather than occupation (Liyanage, 2009); and the formal education system grooming students towards a corporate career and not adequately promoting entrepreneurial inclination (Timmons, 1994, as cited by Millman, Li, Matlay and Wong, 2010).

As any measures taken to foster the growth of IT entrepreneurship would necessitate the appreciation of factors influencing entrepreneurial inclination, the empirical study on which this paper is based purports to examine the factors influencing the entrepreneurial intention of Sri Lankan IT undergraduates in order to understand the causes underlying the low level of graduate entrepreneurship in the industry. Although student entrepreneurial intent studies “do not constitute a novelty” at an international level (Franco, Haase and Lautenschläger, 2010), local empirical studies focusing on the entrepreneurial intent of graduates or university students are sparse, and even more so within the context of information technology.

The objectives of the study are: to identify the factors influencing graduate entrepreneurial intent in the IT industry; to establish the extent to which such factors influence entrepreneurial intent; and, the provision of recommendations so as to facilitate remedial action.

It is believed that such a study will augment the extant literature by theorizing and empirically testing the significance of contextual factors that influence the entrepreneurial intent of undergraduates, with useful implications for policymakers and educators, given the role of higher education institutions in knowledge creation, dissemination and its subsequent conversion into innovative products and services.

This article is structured as follows: it begins with an overview of the need for and the significance of the study followed by a detailed literature review. Thereafter, an outline of the study framework, together with the extant theoretical and empirical support, is provided. A detailed description of data analysis and findings ensues, which is then followed by the conclusions derived from the findings and the recommendations.

## **The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective**

### **The Literature Review and the Theoretical Framework**

Information technology is defined as “the various technologies which are used in the creation, acquisition, storage, dissemination, retrieval, manipulation and transmission of information” (Moll, 1983, as cited by Jimba, 1999). With the advancement of information technology and communication, and associated innovations in the recent past, a new economy, referred to variously as the “knowledge economy”, “innovation economy”, “online economy”, and “digital economy” (Cohen et al., 2000, as cited by Hafezieh et al., 2011), is said to have emerged. In the wake of this transition towards this new economy, with information technology pervading every aspect of industry and service (Scott-Morton, 1995, as cited by Carrier, Raymond and Eltaief, 2004), the role of entrepreneurship in the field of information technology cannot be overemphasized.

Digital entrepreneurship is defined by Hull et al., (2007), as cited by Hafezieh; et.al, (2011), as a “subcategory of entrepreneurship in which some or all of what would be physical in a traditional organization has been digitized”. Several factors distinguish digital entrepreneurship from that which is traditional: “ease of entry”; “ease of manufacturing and storing”; and “ease of distribution in the digital marketplace” (Hull et al., 2007, as cited by Hafezieh et al., 2011).

The attempts to identify the factors influencing the decision to embark on entrepreneurship have led to the emergence of distinct streams of research. One stream focuses on internal factors, or the links between certain personality traits and ambitions, based on the assumption that entrepreneurs are endowed with unique traits (Liñán, Santos and Fernández, 2011, in reference to works of several authors). Another stream of research investigates the contributions of external factors, which may either be demographic (Liñán, Santos and Fernández, 2011, in reference to works of: Cooper and Dunkelberg 1987; Dahlgvist et al., 2000; Cooper et al., 1994; Reynolds et al., 1994; Storey, 1994; and Wagener et al., 2010) or contextual factors (Liñán, 2008, in reference to works of Gnyawali and Fogel, 1994; and Davidsson and Henkson, 2002).

Although research findings do indicate that personality factors may impact new venture creation indirectly, (Rauch and Frese, 2000, as cited by Gelderen et al., 2008), it has not been possible to isolate specific causative traits or to distinguish entrepreneurs from managers or even the general population on the basis of

possessing such traits (Gedeon, 2012, in reference to the works of several eminent authors). The trait approach has thus been criticized as an inadequate method of measuring causality as it is almost exclusively focused on entrepreneurs after the event of entrepreneurship, in lieu of those who have not experienced it, on the assumption that entrepreneurial traits and attitudes are not subject to change as a result of the experience itself (Autio, Keeley, Klofsten, Parker and Hay, 2001, in reference to the works of Gartner, 1988; Gartner, 1989). The approach has, therefore, been considered to be weak in predictive capacity, (Rauch and Frese, 2000, as cited by Gelderen; et al., 2008), as considering personal characteristics per se tends to underestimate the impact of skills and learning (Deakins, 1996, as cited by Madsen, Neergaard and Ulhøi, 2008). This view has been supported by Drucker (1985) and Gorman (1997), as cited by Cheng, Chan, and Mahmood, (2009), who maintain that entrepreneurship can be taught, although the extent to which this may be achieved still remains a matter of contention (Fiet, 2000, as cited by Jorge-Moreno, Castillo, Triguero, 2012).

The trait approach also suggests that individuals possessing such entrepreneurial characteristics approach entrepreneurship regardless of environmental conditions, when in fact there are distinct variations in the rates of entrepreneurship between countries and regions, particularly between developed and developing countries, implying the impact of contextual or environmental factors on entrepreneurial intentions. Lüthje and Franke (2003) argue that the environment provides an explanation as to the non-deterministic influence of traits on entrepreneurship. 'Entrepreneurial environment' refers to "a combination of factors that play a role in the development or nurturing of entrepreneurship and entrepreneurial activities." (Pennings, 1980, as cited by Qunlian, 2011).

The significance of technology, the level of economic development, culture and institutions on creating opportunities for start-ups was established by Wennekers et al. (2002, as cited by Ahmad and Xavier, 2012). Baharami and Evans (1995, as cited by Chen, Li and Yu, 2008) further asserted the importance of environmental factors, arguing that technological clusters impact the direction and pace of innovation through convenient access to complementary resources and capabilities, and facilitate the development of technological firms through an industrial ecology consisting of cluster service intermediaries, research institutes, universities and venture capitalists, such as is found in Silicon Valley. Beck and Demirguc-Kunt (2006) as cited by Ahmad et al., (2012) also advocated that entrepreneurial environments must

## **The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective**

be strengthened so as to make them conducive for start-ups, whilst “Doing Business 2013”, which compares quantitative indicators on business regulations for domestic firms in 185 economies, has associated regulatory reforms in low-income economies with an increase in the growth rate of 0.4 percentage points for the ensuing year.

Although the environment may provide an elucidation as to varying rates of entrepreneurship between nations, its influence on decision alternatives and choices is asserted to be indirect, as a result of the potential for individual creativity and autonomy in choice (as cited by Kor, Mahoney and Michael, 2007 in reference to the works of several authors) and diverse perceptions of a given situation (Casson, 1982, as cited by Kor et al., 2007). Mitchell et al., (2002) as cited by Liñán, Santos and Fernández, (2011) define entrepreneurial cognitions as “the knowledge structures that people use to make assessments, judgments or decisions involving opportunity evaluation, venture creation and growth”. The influence of factors in the external environment is reflected as attitudes and intentions of potential entrepreneurs, and consequently expressed in behaviour, through the processes of perception and motivation (Liñán, Santos and Fernández, 2011). Perception, being a cognitive construct, refers to “mental representations of the external environment around individuals, captured through their senses and elaborated in their minds” (Liñán, Santos and Fernández, 2011), or “subjective interpretation of reality” (Arenius and Minniti, 2005, as cited by Liñán, Santos and Jose Fernández, 2011) and, as such, may also provide some elucidation as to why certain individuals are more sensitive to market opportunities and resources than others (Liñán, Santos and Fernández, 2011, in reference to the works of Shane and Venkataraman 2000; Ardichvili et al., 2003). Individual perceptions, particularly those relating to attitude and self-efficacy, have been found to be significant antecedents of entrepreneurial intention (Krueger et al., 2000, as cited by Liñán, Santos and Fernández, 2011). It is thus hypothesized that:

*H1: Students who perceive the entrepreneurial environment as supportive of entrepreneurship are more likely to have stronger self-efficacy towards entrepreneurship.*

Self-efficacy has been defined as “a belief in one’s own capabilities to organize and execute the course of action required to attain a goal” (Bandura, 1977, as cited by Kurbanoglu, 2003). Self-efficacy has not only been identified as a vital antecedent variable in acquiring entrepreneurial intentions (Laviolette, Lefebvre and Brunel, 2012, in reference to the works of several eminent authors), but also as a factor

increasing the probability of subsequent translation of intentions into actions (McGee et al., 2009, as cited by Laviolette; et.al, 2012).

Attitude is “a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object” (Fishbein and Ajzen, 1975, as cited by Schwarz, Wdowiak, Almer-Jarz, and Breitenecker, (2009). Ajzen and Fishbein (1977, as cited by Laviolette; et al., 2012) assert a strong interconnection between attitudes and behaviour on the basis that intended behaviour is consistently preceded by a deliberate decision to act, and attitudes influence this deliberation. Given that attitudes vary over time and according to circumstances as a result of interactions, the attitudinal approach is found to be more indicative of actual behaviour, and therefore, more amenable to prediction at a given point in time (Carlson, 1985, as cited by Harris, and Gibson, 2008). Autio (1997, as cited by Schwarz et al., 2009), found that attitudes account for approximately 50 percent of the variations in intentions. In view of the above, the following hypotheses will be tested:

*H2: Students with positive personal attitudes towards entrepreneurship will be more likely to have stronger entrepreneurial intentions.*

*H3: Students with positive self-efficacy towards entrepreneurship will be more likely to have stronger entrepreneurial intentions.*

University support is defined as “the process of providing individuals with the ability to recognize commercial opportunities and the insight, self-esteem, knowledge and skills to act on them, and includes instruction in opportunity recognition, commercializing a concept, marshalling resources in the face of risk, and initiating a business venture” (Jones and English, 2004, p. 416, as cited by Iacobucci, and Micozzi, 2012). George and Prabhu (2000), as cited by Pruett, Shinnar, Toney, Llopis and Fox (2009), emphasized the role of developmental institutions in emerging economies and the significance of knowledge, skills, and the awareness of entrepreneurial opportunities in positively influencing entrepreneurial endeavours. Entrepreneurship education is also considered vital in enhancing innovative capabilities in rapidly changing contexts, particularly within a technological learning sphere (Menzies and Paradi, 2003, as cited by Iacobucci et. al, 2012). A study on entrepreneurial intention, involving university students in diverse contexts, highlights the influence of encouragement gained from the university environment

## **The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective**

(Autio et al., 1997, as cited by Jorge-Moreno et al., 2012), emphasizing the impact of entrepreneurship education on the level of self-efficacy (Liñán, Santos and Fernández, 2011).

Although inventions and technological development are considered vital in the process of value creation and competitiveness, that value is realized only through their commercial exploitation (Petti and Zhang, 2011); social capital is said to pave the way for such recognition and exploitation of opportunities, and has, therefore, been inextricably linked to new venture creation, (Davidsson and Honig, 2003, as cited by Ferri, Deakins, and Whittam, 2009). Social capital refers to the resources that a person may have access to by means of his or her social relations with others (Nahapiet and Ghoshal, 1998, as cited by Ferri et al., 2009), and may either be bridging or bonding (Liñán and Santos, 2007).

Bridging social capital, or connections with entrepreneurial networks and start-up support bodies, is known to increase self-efficacy through enhanced knowledge of entrepreneurial activities and support (Liñán and Santos, 2007). When applied in the context of university support, the role of university incubators in providing access to knowledge and resources has been recognized as significant (Peters et al., 2004 as cited by McAdam and Marlow, 2008). University incubators provide such support through technical advice, seed capital and management guidance, whilst facilitating connections with business angels and venture capitalists (Albert and Gaynor, 2003, as cited by McAdam and Marlow, 2008). Considering that individuals employ prior experience in forming beliefs about their potential (Kurbanoglu, 2003, in reference to the works of several authors), the impact of such university support measures on self-efficacy, particularly the acquisition of tacit knowledge (Polanyi, 1967, as cited by Chrisman, McMullan, Ring and Holt, 2012), may be expected to be positive. This is due to the fact that, although education is predicted to enhance the level of self-efficacy (Wilson et al., 2007 as cited by Jorge-Moreno et al., 2012), it has been asserted that efficacy relates more to “judgments of what one can do with whatever skills one possesses” (Bandura, 1986, p. 391 as cited by Engle et al., 2010), which is linked to the acquisition of tacit knowledge. The following hypothesis will therefore be tested:

*H4: Students who perceive the university context as supportive of entrepreneurship are more likely to have stronger self-efficacy towards entrepreneurship.*

Bonding social capital, or strong ties with family and close relationships with entrepreneurs, is associated with an enhanced favourable personal attitude towards entrepreneurship (Liñán and Santos, 2007). Particularly in Asian countries, where capital constraints are often cited as the critical limiting factor towards entrepreneurial inclination, and institutionalized forms of support are not well established, intervention from family and friends is commonplace, even extending towards filling labour demands (Ronnas, 2001, as cited by Baughn, Cao, Le, Lim and Neupert, 2006). Furthermore, the role model theory suggests that interaction with role models is associated with a positive impact on attitudes (Landry et al., 1992, as cited by Uslay, Teach and Schwartz, 2002), and is also considered to be a reinforcement of self-efficacy, as acquaintanceship with an entrepreneur may lead to a greater probability of perceiving oneself as being one (Scherer et al., 1991, as cited by Liñán, Santos and Fernández, 2011). Supported by such theoretical and empirical evidence, the following hypotheses will be examined:

*H5: Students who perceive role model success positively are more likely to have stronger personal attitudes towards entrepreneurship.*

*H6: Students who perceive role model success positively are more likely to have stronger self-efficacy towards entrepreneurship.*

*H7: Personal attitude towards entrepreneurship mediates the relationship between role model influence and entrepreneurial intent.*

*H8: Self-efficacy mediates the respective influences of the constructs comprising role model influence, environmental factors and university support on entrepreneurial intent.*

With the limitations of the trait theory in explaining entrepreneurial behaviour, and with perceptual constructs such as self-efficacy being consistently employed in entrepreneurial cognitive research, the entrepreneurial intentions model emerged as a predictor of new venture creation (Liñán, Santos and Fernández, 2011, in reference to the works of Krueger et al., 2000; Kolvereid 1996; Liñán and Chen 2009). Entrepreneurial intention has been identified as “a conscious state of mind that directs attention, experience and action toward a specific object or pathway to achieve it” (Ferreira, Raposo, Ricardo Rodrigues, Dinis and Paço, 2012, in reference to the works of several eminent authors). Given that entrepreneurial action is

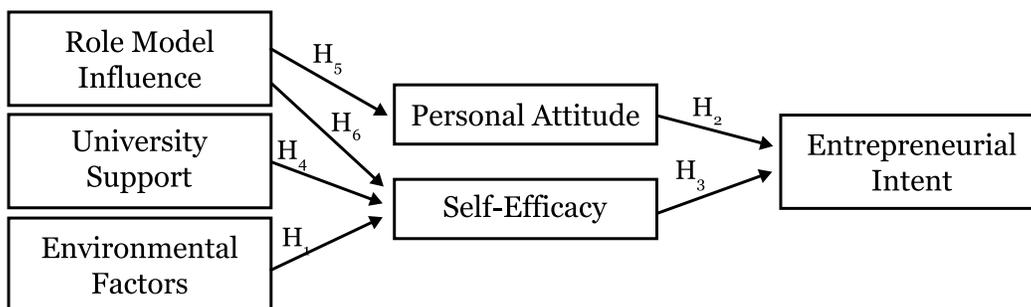
## The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective

classified as planned behaviour, forming an intention towards entrepreneurship is considered to be the initial step in the process of venture creation (Gartner, 1994, as cited by Iakovleva, Kolvereid and Stephan, 2011); thus, determining the factors that influence entrepreneurial intent is essential in identifying those influencing entrepreneurship. As it has been suggested that cognitive elements such as attitudes and self-efficacy are susceptible to change and may be influenced by variations in external factors, it would also be of relevance to consider how it might be possible to shape entrepreneurial intent through cultivating positive attitudes and self-efficacy, as well as by enhancing such contextual factors.

It is thus considered apt to view students' entrepreneurial intent from this contextual viewpoint, i.e., by considering the impact of environmental factors, university support and role model influence on the cognitive constructs of attitude and self-efficacy, and thereby on entrepreneurial intent (Liñán, Rodríguez-Cohard and Rueda-Cantucho 2011, Liñán and Santos 2007, Schwarz, Wdowiak, Almer-Jarz, and Breiteneker, 2009) as presented in the following conceptual framework.

### The Study Framework

Figure 1: Conceptual Framework



### The Methodology and Sample

This research was a quantitative study, with a sample of 300 undergraduates, drawn from eight governmental, semi-governmental and private institutions offering undergraduate courses in IT. The constructs were measured based on a Likert scale questionnaire, with responses ranging from "total disagreement" (1) to "total agreement" (5).

The scales for the constructs of entrepreneurial intent, role model influence and the cognitive constructs of attitude and self-efficacy were drawn from the work of Liñán, Rodríguez-Cohard and Rueda-Cantuche (2011). The measurement items for entrepreneurial intent included: "My professional goal is to become an entrepreneur" and "I will make every effort to start and run my own firm". Items comprising the self-efficacy scale included "I can control the creation process of a new firm" and "I know the necessary practical details to start a firm". Personal attitude was measured using items such as "Being an entrepreneur implies more advantages than disadvantages to me" and "A career as an entrepreneur is attractive to me", whilst the role model scale included "I am familiar with his /her activity as an entrepreneur" and "He/She can be considered a good entrepreneur".

The scale items for the constructs of environmental factors and university support were drawn from the study of Schwarz; et al., (2009). The items measuring the construct of university support included "There is a well functioning support infrastructure in place to support the start-up of new firms" and "The creative atmosphere inspires us to develop ideas for new businesses". Items comprising the environmental factors construct scale were reverse scored and included "Banks do not readily give credit to start-up companies" and "The bureaucratic procedures for founding a new company are unclear".

Dual versions of the questionnaire featuring an alternate arrangement of questions were utilized so as to minimize distortions attributable to the order effect, and were distributed in person. Participation in the study was voluntary and participants were assured of anonymity.

### **Data Analysis and Findings**

Although a total of 319 questionnaires were collected, the number of usable responses was 248. The mean values of the indicators for the respective institutes were utilized in replacing the missing values, in a negligible proportion of the sample. The demographical analysis indicated that 151 (60.9%) of the respondents comprised males, whilst 97 (39.1%) were female. The age of respondents from state universities averaged at 23.5 years, with a standard deviation (SD) of 1.02, and those from private institutes at 22.2 years with a SD of 1.75.

## The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective

**Table 1: Descriptive statistics**

Construct	Minimum	Maximum	Mean	Standard Deviation
Entrepreneurial Intent (EI)	1.00	5.00	3.12	.993
Self-Efficacy (SE)	1.00	5.00	2.96	.747
Personal Attitude (PA)	1.60	5.00	3.43	.668
University Support (US)	1.00	5.00	3.29	.794
Environmental Conditions (EC)	1.00	4.80	2.91	.695
Role Models (RM)	1.00	5.00	3.77	.992

*Source:* SPSS Data Analysis

Mean values extracted, as depicted in Table 1, indicated that the role model construct had the highest mean score (3.77 with SD of 0.992), followed by personal attitude (3.43 with SD of 0.668), university support (3.29 with SD of 0.794) and entrepreneurial intent (3.12 with SD of 0.993). Self-efficacy and environmental factors (2.96 with SD of 0.747 and 2.91 with SD of 0.695, respectively) fell short of the median point of the scale (3), with a low rate of dispersion.

The results of the test for skewness revealed a skewed distribution, whilst the Shapiro-Wilks test results also indicated deviations from normality. Due to the violation of multivariate normality assumptions, a structural equations model - Partial Least Squares (PLS), which does not place reliance on a normal data distribution (Chin, 1998) - was used in analyzing the data. PLS also permits the simultaneous assessment of multiple equations through a two-dimensional approach (Henseler, Ringle and Sinkovics, 2009): an assessment of the relationship between the indicators and the latent variables (the measurement model), followed by an evaluation of the theoretical relationships between the latent variables (the structural model). As measurement errors are factored into the estimation, more accurate estimates of interaction effects such as mediation are predicted (Chin, 1998). The analytical procedures discussed below were conducted with the aid of SmartPLS 2.0 (Ringle, Wende, and Will 2005).

In evaluating the measurement and structural models, two distinct data sets were utilized, as the role model influence construct was not applicable to all participants, and the 'pair-wise deletion option' which ignores missing values attributable to a construct, whilst proceeding with the analysis of the remaining variables, was not

available on SmartPLS2.0. A bootstrap re-sampling procedure with 200 sub-samples was utilized in order to determine the statistical significance of the coefficients of the structural models (as cited by Henseler et al., 2009, in reference to the works of Davison and Hinkley, 2003; and Efron and Tibshirani, 1993).

### ***The Measurement Model***

In establishing validity and reliability, initial model assessment focused on measurement models. The Cronbach's alpha criterion (Cronbach, 1951, as cited by Henseler et al., 2009) was applied initially for the data set without the role model construct, in which instance, with the exception of environmental conditions (which scored 0.672), all scores exceeded the suggested threshold level of 0.70, as seen in Table 2, indicating internal consistency reliability.

In addition, individual item and composite (as depicted in Table 2) reliability (Werts, Linn, and Jöreskog, 1974, as cited by Henseler et al., 2009) were also assessed; it was found that all indicators, apart from two relating to the environmental construct, met the requisite 0.70 threshold for internal consistency reliability (Nunnally and Bernstein, 1994, as cited by Henseler et al., 2009). The test was, therefore, repeated subsequent to the elimination of the environmental conditions construct from the analysis, whereupon results indicating an acceptable level of internal consistency were obtained.

**Table 2: Cronbach's alpha, composite reliability and the average variance extracted**

<b>Construct</b>	<b>Cronbach's Alpha</b>	<b>Composite Reliability</b>	<b>Average Variance Extracted</b>
EI	0.899	0.923	0.667
PA	0.874	0.908	0.666
SE	0.802	0.858	0.502
US	0.750	0.838	0.564
EC	0.672	0.775	0.412

*Source:* SmartPLS Data Analysis

## **The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective**

In assessing convergent validity, the average variance extracted (AVE) was applied as the criterion (Fornell and Larcker, 1981, as cited by Henseler et al., 2009). Reaching the recommended threshold of 0.50 is indicative of adequate convergent validity (Götz, Liehr-Gobbers, and Krafft, 2009, as cited by Henseler et al., 2009). On examining the estimates (displayed in Table 2), it is evident that the constructs captured a minimum of 50 percent (on average) of the variance of its indicators, given that the AVE scores exceeded the prescribed threshold of 0.50.

Discriminate validity is inferred at an indicator level, when the diagonal loadings (item loadings) exceed the off-diagonal loadings (cross loadings) in the corresponding rows and columns (Chin, 1998; Götz et al., 2009, as cited by Henseler et al., 2009). The results (as presented in Table 3) suggest that the constructs shared a greater proportion of the variance with their respective measures, denoting satisfactory discriminant validity.

The factor loadings and the composite reliability for the role model construct (assessed independently) confirmed the reliability of the survey instrument in measuring the individual items relevant to this construct, with the factor loading denoting values of 0.829 and 0.901, both of which exceed the acceptable threshold of 0.707 (Chin, 1998), and the composite reliability (Werts, Linn, and Jöreskog, 1974, as cited by Henseler et al., 2009) registering at 0.857.

In assessing the convergent validity of the data for the role model construct, the estimates indicated that AVE scores exceeded the prescribed threshold of 0.50 by a generous margin (0.75), implying that the construct captured, on average, more than 50 percent of the variance of its indicators, (Götz, Liehr-Gobbers, and Krafft, 2009, as cited by Henseler et al., 2009). The item loadings exceeded the cross loadings considerably, implying more than satisfactory discriminant validity for the role model construct as well.

**Table 3: Cross loadings**

	<b>EI</b>	<b>PA</b>	<b>SE</b>	<b>US</b>
EI_2	0.688	0.420	0.405	0.154
EI_3	0.836	0.582	0.508	0.163
EI_4	0.840	0.580	0.462	0.209
EI_5	0.848	0.606	0.510	0.186
EI_6	0.857	0.658	0.554	0.167
EI_7	0.817	0.636	0.506	0.137
PA_1	0.511	0.727	0.384	0.182
PA_2	0.559	0.841	0.375	0.256
PA_3	0.544	0.849	0.446	0.383
PA_4	0.579	0.851	0.416	0.312
PA_5	0.700	0.805	0.478	0.288
SE_1	0.411	0.306	0.692	0.184
SE_2	0.522	0.320	0.730	0.089
SE_3	0.416	0.476	0.756	0.129
SE_4	0.345	0.302	0.669	0.083
SE_5	0.405	0.335	0.708	0.185
SE_6	0.440	0.456	0.694	0.267
US_1	0.173	0.364	0.118	0.694
US_2	0.151	0.240	0.190	0.803
US_3	0.159	0.223	0.207	0.763
US_4	0.146	0.278	0.128	0.739

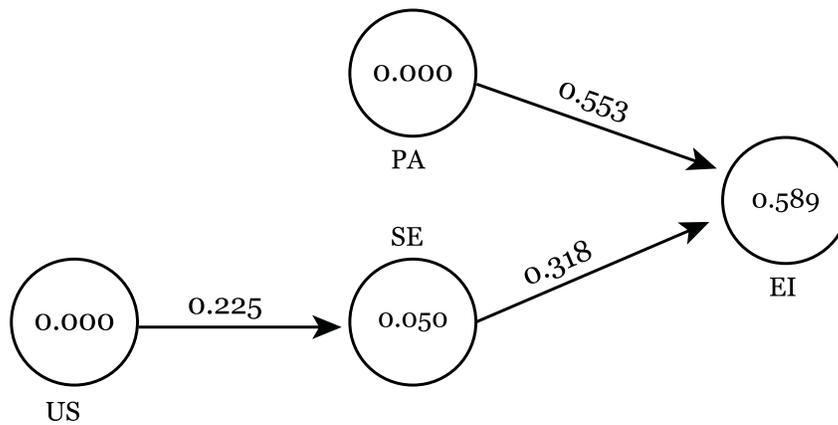
*Source:* SmartPLS Data Analysis

### ***The Structural Model***

Upon confirmation of the consistency of the measurement model, the dual versions of the structural model (which reflect the exclusion/inclusion respectively of the data relevant to the role model construct), as depicted in Figures 1 and 2, were evaluated in order to assess the extent to which the hypothesized model was supported by the data.

## The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective

**Figure 2: The Structural Model for All Respondents**



Source: SmartPLS Data Analysis

The analysis for the first structural model (denoted in Figure 2), where data from all respondents was considered in the absence of the role model construct, confirmed the expected strong influence of the cognitive variables comprising personal attitude and self-efficacy on entrepreneurial intent, and that of university support on self-efficacy. Chin (1998, as cited by Ferreira et al., 2012) advocates that relationships between constructs with structural coefficients exceeding 0.2 may be considered as robust. The significant positive path coefficients (as depicted in Table 4) provide evidence in support of the positive relationships proposed between personal attitude and entrepreneurial intent (0.553), self-efficacy and entrepreneurial intent (0.318), and university support and self-efficacy (0.225). All path coefficients are also significant at  $p < 0.001$ , thus supporting Hypotheses H2, H3 and H4.

**Table 4: Path coefficients for all respondents**

Hypothesis No	Path	Beta
H2	Personal Attitude – Entrepreneurial Intent	0.553**
H3	Self- Efficacy – Entrepreneurial Intent	0.318**
H4	University Support – Self- Efficacy	0.228**

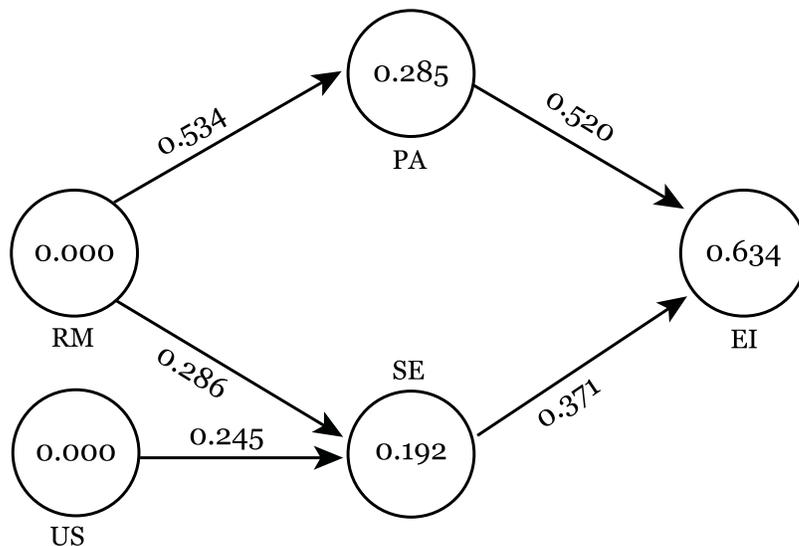
\*\* $p < 0.001$

Source: SmartPLS Data Analysis

As indicated in Figure 2 depicting the squared multiple correlations ( $R^2$ ), it is evident that only 5 per cent of the variations in the self-efficacy construct were accounted for by university support measures. Upon evaluation of the structural model for respondents with role models (displayed in Figure 3), however, it was apparent that, when combined with role model influence, more than 19.2 per cent of the variations in self-efficacy may be attributed to these constructs.

When considering the ultimate dependent variable, viz., entrepreneurial intent, estimates indicated that 58.9 per cent of variations in the construct were explained by personal attitude and self-efficacy. According to Liñán and Chen (2009), this result may be considered to be highly satisfactory, as prior research utilizing linear models typically accounted for less than 40 per cent of entrepreneurial intent.

**Figure 3: The Structural Model for Respondents with Role Model Influence**



Source: SmartPLS Data Analysis

The analysis for the second structural model (as denoted in Figure 3), where the data from respondents with role models was considered, indicated even stronger relationships between the constructs. The significant positive path coefficients (denoted in Table 7) of 0.534 for role model influence on personal attitude, and 0.286 for role model influence on self-efficacy provided support for hypotheses  $H_5$  and  $H_6$ .

## **The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective**

respectively. All path coefficients were also significant at  $p < 0.001$ . An increase in magnitude of the influence of self-efficacy on entrepreneurial intent was observed (as denoted by the stronger path coefficient of 0.371 over 0.318), presumably assisted by the relationship between role model influence and self-efficacy.

The simultaneous impact of the variables of university support and role model influence enabled the model to explain 19.2 per cent of the variations in the construct of self-efficacy, satisfying the threshold of 15 per cent or 0.15 (Cohen, 1988, as cited by Wilden, Gudergan, Nielsen and Lings. 2012) for moderate effect size.

The role model influence construct also demonstrated a very strong relationship with the personal attitude construct (reflected by a path coefficient of 0.534) and explained 28.5 percent of the variations in that construct. The  $R^2$  value for entrepreneurial intent increased further to 63.4 per cent, which is considered extremely satisfactory since it is well above the recommended threshold of 35 per cent or 0.35 for strong effect (Cohen, 1988, as cited by Wilden et al., 2012).

### ***The Mediator Test***

Although PLS is asserted to be effective in testing the mediation effect of non-normal data, formal guidelines on the use of PLS in testing mediation are not available at present (Bontis, Booker and Serenko, 2007). Therefore, a generally recommended approach for testing mediation, based on studies conducted by Baron and Kenny (1986, as cited by Bontis et al., 2007), was adopted.

Perfect mediation is said to exist in instances where the independent variable has no impact when the mediator is controlled (Baron and Kenny, 1986). Table 5 depicts the estimates for Model 1, where self-efficacy mediates the relationship between university support and entrepreneurial intent, with the path coefficient of the direct link indicating 0.212 (1b) at a level of significance of  $p < 0.001$ , in the absence of mediation, and subsequently diminishing to 0.080 on the introduction of self-efficacy in Model 1(c). This is suggestive of partial mediation and the existence of a direct relationship between university support and entrepreneurial intent.

**Table 5: Model 1 – The test for self-efficacy (mediating university support)**

<b>Model</b>	<b>Path</b>	<b>Beta</b>
Model 1 (a)	University Support – Self-Efficacy	0.255**
Model 1 (b)	University Support – Entrepreneurial Intent	0.212**
Model 1 (c)	University Support – Entrepreneurial Intent	0.080
	University Support – Self-Efficacy	0.219**
	Self-Efficacy – Entrepreneurial Intent	0.587**

\*\*p < 0.001

*Source:* SmartPLS Data Analysis

Estimates for Model 2, as depicted in Table 6, illustrate the mediatory effect of self-efficacy on the relationship between role model influence and entrepreneurial intent. The path coefficient of the direct link between role model influence and entrepreneurial intent registered 0.443 (2b) at a high level of significance ( $p < 0.001$ ), in the absence of the mediating influence of self-efficacy, and subsequently decreased to 0.212 on the introduction of self-efficacy into the model {Model 2(c)}, implying partial mediation, and also the existence of a direct relationship between role model influence and entrepreneurial intent.

**Table 6: Model 2 – The test for self-efficacy (mediating role model influence)**

<b>Model</b>	<b>Path</b>	<b>Beta</b>
Model 2 (a)	Role Model Influence – Self-Efficacy	0.398**
Model 2 (b)	Role Model Influence – Entrepreneurial Intent	0.443**
Model 2 (c)	Role Model Influence – Entrepreneurial Intent	0.212**
	Role Model Influence – Self-Efficacy	0.374**
	Self-Efficacy – Entrepreneurial Intent	0.596**

\*\*p < 0.001

*Source:* SmartPLS Data Analysis

Table 7 presents the estimates for Model 3, which tested the mediatory effect of personal attitude on the relationship between role model influence and entrepreneurial intent. The path coefficient of the direct link between role model influence and entrepreneurial intent recorded 0.443 (3b) at  $p < 0.001$  level of significance, when the mediating influence of self-efficacy was absent, and subsequently declined to 0.058

## **The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective**

on its introduction into the model {Model 3(c)}, suggesting partial mediation, and also the direct impact of role model influence on entrepreneurial intent.

**Table 7: Model 3 – The test for personal attitude (mediating role model influence)**

<b>Model</b>	<b>Path</b>	<b>Beta</b>
Model 3 (a)	Role Model Influence – Personal Attitude	0.545**
Model 3 (b)	Role Model Influence – Entrepreneurial Intent	0.443**
Model 3 (c)	Role Model influence – Entrepreneurial Intent	0.058
	Role Model Influence – Personal Attitude	0.553**
	Personal Attitude – Entrepreneurial Intent	0.708**

\*\*p < 0.001

*Source:* SmartPLS Data Analysis

Upon an evaluation of the results of all the mediator tests, hypotheses H<sub>7</sub> and H<sub>8</sub>, which proffered the mediating effects of the cognitive constructs, were also found to be verified. It may, therefore, be concluded that the hypothesized model has been well supported by the data collected, although the direct influence of role models and university support on entrepreneurial intent may provide scope for further investigation.

### **Discussion on Findings**

The theoretical underpinnings of and implications flowing from the findings of the study, the overall purpose of which was to identify those contextual factors which affect the entrepreneurial intent of IT undergraduates in Sri Lanka, and understand the extent to which such factors are influenced by cognitive factors, will be delineated further in this section.

The cognitive factors comprising perception and attitude, as discussed earlier, were found to have a potent and direct influence on the entrepreneurial intent of the IT undergraduates surveyed. The variations in the ultimate dependent variable, entrepreneurial intent, were explained by the constructs of personal attitude and self-efficacy to an estimated 58.9 per cent in the absence of the role model construct data, and 63.4 per cent when it was included in the analysis, which is considerably greater than the 40 per cent reported in earlier research conducted on entrepreneurial intent employing linear models (Liñán and Chen, 2009), and that which was reported in the aforementioned study (55.5%).

The strong, positive impact of self-efficacy on entrepreneurial intent has been confirmed in the statistical analysis. This is consistent with the findings of similar studies examining the influence of self-efficacy on entrepreneurial intention (Krueger et al., 2000 as cited by Engle; et.al, 2010). Whilst self-efficacy may be brought about by varied processes, this has implications for educational initiatives aimed at developing entrepreneurial potential, given that possessing the relevant skill set would not only enable the effective operation of the new venture, but would also promote or strengthen entrepreneurial intent (Liñán, 2008).

The potent influence of a favourable personal attitude on higher entrepreneurial intent levels was also more than substantiated in the study. This is consistent with empirical findings, where attitudes have been found to account for approximately 50 percent of the variance in intentions (Autio, 1997 as cited by Schwarz et al., 2009). Whilst this positive relationship between personal attitude and entrepreneurship is found to be extremely relevant in explaining the entrepreneurial intention of IT undergraduates, this has implications for educators; given the strong impact of attitudes on entrepreneurial intent and the fact that attitudes are susceptible to change, attitudes may be influenced by educators towards an innovative mindset (Robinson et al., 1991, as cited by Wu, and Wu, (2008).

The statistical analysis revealed a very strong relationship between the constructs of role model influence and personal attitude, and between those of role model influence and self-efficacy; role model influence has been found to exert a very powerful, positive influence on the aforementioned perceptual constructs. The study supports the extant research, where the effect of role model influence on personal attitude and self-efficacy has been firmly established (Scherer, 1989, as cited by Auken, Fry and Stephens, 2006). Apart from this indirect effect of role model influence on entrepreneurial intent, through the mediating perceptual influence of personal attitude and self-efficacy, a direct relationship between role model influence and entrepreneurial intent could also be inferred from the results of the research. This direct relationship between role model influence and entrepreneurial intent, which circumvents the perceptual effect, has not been explained in theory, although similar observations have been reported by researchers (Liñán, Urbano and Guerrero, 2011).

The relationship between university support and self-efficacy was also confirmed in the study. The research of Autio et al., (1997), as cited by Turker and Selcuk (2009), on entrepreneurial intention, affirmed this view demonstrating that the university

## **The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective**

environment had an important impact on the entrepreneurial conviction of students. As individuals are said to employ prior experience in forming beliefs about their potential (as cited by Kurbanoglu, 2003, in reference to several eminent authors), the impact of such university support measures, particularly the acquisition of tacit knowledge (Polanyi, 1967, as cited by Chrisman et al., 2012), may be expected to be positive. As in the case of role model influence, a direct effect of university support on entrepreneurial intent could be inferred from the research findings.

The environmental support factors were not found to be of relevance to undergraduate entrepreneurial intent. The construct measurement items were adapted from those used in a study based in Austria (Schwarz et al., 2009), where a similar result has been reported. This finding does, however, contradict those usually reported in entrepreneurship literature with regard to environmental support (Ahmad and Xavier, 2012). In a similar study conducted on undergraduates, Turker and Selcuk (2009) noted that educational support was perceived to be of greater relevance than that which is structural, and suggested that this may be attributable to the timing differences involved, leading to the latter being perceived to be of less immediate importance. The negative relationship between environmental support conditions and entrepreneurial intent may also be attributable to the IT-specific context of the research study. Prior research, such as that conducted by Turker and Selcuk (2009), involved undergraduates drawn from all disciplines. It is possible that the "ease of entry", "ease of manufacturing and storing", and "ease of distribution" in a digital context, (Hull et al., 2007, as cited by Hafezieh et al., 2011), negate the relevance of environmental factors. The negative relationship could also be attributed to the fact that in Asian countries, although capital constraints are often cited as the critical limiting factor towards entrepreneurial inclination, and institutionalized forms of support are not well established, intervention from family and friends is commonplace (Ronnas, 2001, as cited by Baughn et al., 2006), and could, therefore, lead to a diminished perception of the importance of environmental support factors.

Although the general economic conditions are expected to affect the overall start-up rates in a nation (Thurik et al., 2002, as cited by Liñán, Santos and Fernández, 2011), at an individual level, entrepreneurial inclination is said to be attributable to one's cognitive processes and the resultant perceptions of economic opportunities, irrespective of reality (Arenius and Minniti 2005, as cited by Liñán, Santos and Fernández, 2011). This impact of cognitive biases on the perceptions of economic opportunities has also been asserted by Keh et al., (2002, as cited by Liñán,

Santos and Fernández, 2011). Therefore, despite the apparently varied nature of these possible causes for the negative relationship between environmental factors and entrepreneurial intent stated above, they may all eventually be attributed to perceptions, which goes on to demonstrate the appropriateness of cognitive approaches in explaining entrepreneurial intent.

The contextual factors statistically accounted for nearly 20 percent of the variations in self-efficacy whilst nearly 30 percent of the variations in personal attitude were explained exclusively through role model influence. Also noteworthy is the finding that only 5 percent of the variations in self-efficacy could be ascribed to university support, in the absence of role model influence. The fact that this figure rises to nearly 20 percent when such university support measures are combined with role model influence suggests much potential for remedial intervention. Whilst the potency of role model influence in increasing self-efficacy levels is amply illustrated in the findings, the lower impact of university support measures in the absence of such influence may be ascribed to the fact that efficacy relates more to “judgments of what one can do with whatever skills one possesses” (Bandura, 1986, p. 391 as cited by Engle et al., 2010) or the level of confidence in one’s abilities (which is linked to the acquisition of tacit knowledge), rather than mere academic knowledge, which forms the basis of most university support measures.

The construct measurement items for university support were adapted from those used in a study based in Austria (Schwarz et al., 2009), where support measures such as university incubators are readily available. The facilities available for local IT students are in stark contrast to the scale of such support measures, which might explain why such support measures are perceived as inadequate. Although career opportunities within companies are promoted, entrepreneurship knowledge that may be gained via course modules, incubator facilities and inspirational lectures by successful entrepreneurs cater mainly to business degree students and not to IT undergraduates, with the exception of a few institutes. In most other universities, the division between the disciplines appears to be quite rigid not only with regard to the course content but also the resources available.

As in many other countries, there exists, therefore, a disparity between the curriculum in tertiary education and the expectations which arise from the effects of globalization, thus calling for empowerment through greater relevance of the knowledge gained (Jorge-Moreno et al., 2012), and the need to view enterprise education as “a blend of

## **The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective**

knowledge, skills and attitudes" (as cited by Galloway, Anderson, Brown and Wilson, 2005 in reviewing the work of several researchers) and facilitate learning "for" entrepreneurship, not simply "about" (Jorge-Moreno et al., 2012) it, by transferring entrepreneurship education "out of the classroom and into the real world" (Kirby, 2007, as cited by Ulvenblad, Berggren and Winborg, 2013).

### **Managerial Implications**

Fostering the growth of such an entrepreneurial workforce may have managerial implications, given that global competitive pressure demands exacting standards of employee performance. This is particularly so for firms operating within industries which are inherently dynamic, in which context the ability to respond swiftly, creatively and innovatively is considered vital to prosper if not survive (as cited by Jiao, Alon and Cui in reference to the works of, D'Aveni, 1994; and Hitt et al., 1998) As such, given that entrepreneurial responses are required in order to successfully exploit fleeting opportunities, and overcome strategic challenges, in such intensely competitive landscapes, a pro-active and self-managing workforce may be vital for organizational growth and prosperity (Jacques, 1996; Barringer and Bluedorn, 1999, as cited by Clargo and Tunstall, 2011).

University incubators are also said to add to an organization's resources, without the usual costs associated therewith (as cited by McAdam and Marlow, 2008), in reference to the works of Rothaermel and Thursby, 2005; and Carayannis et al., (2006), given that proximity and links to such university facilities may not only provide access to the latest developments in the area of interest, convertible into innovative products (as cited by McAdam and Marlow, 2008, in reference to the works of Lockett and Wright, 2005; Nouria et al., 2005; and Felsenstein, 1994), but may also lead to significantly lower development costs (Markman et al., 2005, as cited by McAdam and Marlow, 2008).

Furthermore, in view of the fact that social persuasion is known to influence self-efficacy perceptions, particularly when the source is perceived as an expert, (Gist and Mitchell, 1992 as cited by Laviolette; et.al, 2012), the usefulness of "socialization" seminars with the participation of local IT entrepreneurs, and relevant business community stakeholders (Kent, 1990, as cited by Liñán, Rodríguez-Cohard, Carlos, and Rueda-Cantuche, 2010) cannot be overemphasized. "Trial firms" facilitated by incubator facilities, and "match-making events" with "business angels" and

local entrepreneurs, are known not only to develop the relevant skill sets, but also to enhance the perceived feasibility of self-employment (Madsen, Neergaard and Uihøi, 2008). The Central Bank in its Annual Report of 2012 has also recognized this need for a technopreneurial culture, with the proliferation of technology business incubators in order to sustain a high level of economic growth.

### **Limitations and Directions for Future Research**

As in the case of most research studies, the results derived from this research need to be viewed in light of the limitations pertaining to the study. In particular, whilst the study examined the entrepreneurial intent of IT undergraduates, the circumstances that may be related to the actual translation of intentions to venture creation have not been examined. Susceptibility to common method variance, as a result of dependent and independent construct measures being derived from the same source (Podsakoff and Organ, 1986), and the use of non-probability sampling, with the associated implications in relation to the application of inferential statistics, may also be considered as shortcomings. Furthermore, the study was limited to undergraduates in the penultimate and final years of their course, in eight institutions, whereas a wider sample base would offer more scope for generalization. Another limitation is that the cultural implications have not been evaluated in the study, considering that the social homogeneity of the sample base would render such considerations to be much too similar to lend significance to the analysis. This aspect may provide scope for further analysis.

### **Conclusions**

The findings lead to the conclusion that the entrepreneurial intent level of the said population is significantly influenced by contextual factors comprising university support and role model influence, both directly and indirectly (through the mediating effects of favourable personal attitude and significant self-efficacy). The direct relationship between these factors and entrepreneurial intent, circumventing the perceptual effect, has not been explained in theory, although similar observations, affirming the existence thereof, have been reported by researchers (Liñán, Urbano and Guerrero, 2011). Whilst the environmental support conditions were not perceived to be relevant to entrepreneurial intent by the IT undergraduates, the cognitive factors comprising perception and attitude were found to have a potent and direct influence on the entrepreneurial intent of the IT undergraduates surveyed.

## The Impact of Contextual Factors on the Entrepreneurial Intent of IT Undergraduates: A Sri Lankan Perspective

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