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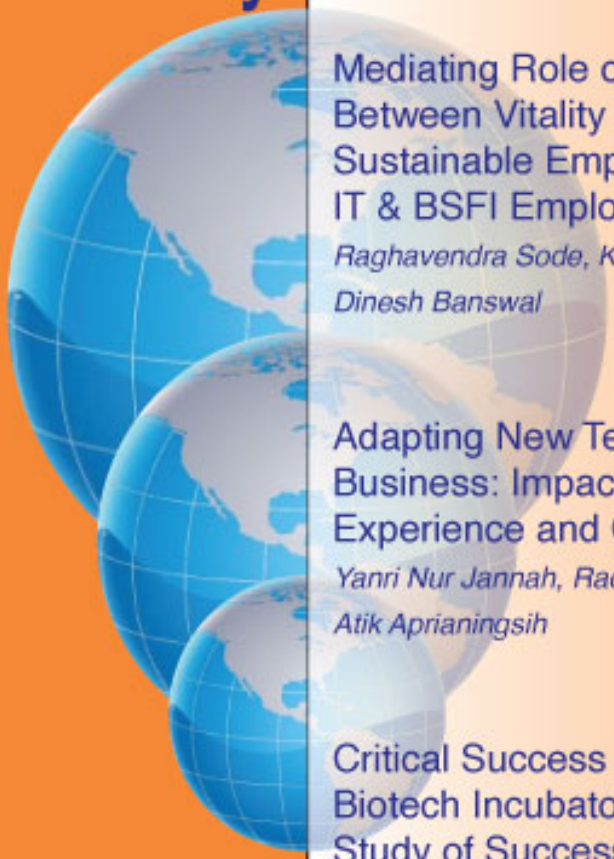

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Managerial Intrapreneurship: Effect of Individual level Competencies and Mediating Role of Trait Emotional Intelligence

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Abstract

In today's volatile, unpredictable, complex and ambiguous (VUCA) environment, businesses face a lot of challenges to survive. It has become very significant for organizations to reinvent and innovate themselves, i.e., display intrapreneurship (entrepreneurship within organization) constantly to remain competitive. Intrapreneurship is the set of actions that lead to opportunity identification and the creation of a new organization by value addition. In this quest, individual competencies cannot be overlooked. Afterall, they are the ones who discover, develop and disseminate ideas and knowledge within organizations. The purpose of this study is to highlight and empirically examine the effect of individual level competencies on managerial intrapreneurship (MI). While the extant literature has isolated various situational level factors which they argue influence MI, there exists a lack of understanding on the observed variations in MI levels between employees exposed to similar organizational conditions. Through theoretical arguments as well as empirical support, this study suggests that difference between three important individual level competencies: cognitive, affective

and action-oriented, account for variations in displayed MI besides personality traits. The study also discusses the mediating role of another important individual competence- trait emotional intelligence (TEI) and the moderating roles of gender and managerial level. A sample consisting of 204 managers was taken for the study from various service organizations across India. Multiple regression and hierarchical multiple regression tests were performed to check the statistical validity. The study indicated a positive correlation between all the three individual level competencies and MI. However, very interestingly the self-control dimension of trait emotional intelligence (TEI), did not emerge as a significant variance predictor of MI. Based on the findings, the study argues that to nurture intrapreneurship within organizations, all the three individual-level competencies are important; thus, enriching the management literature. Suitable theoretical and managerial implications have been discussed.

Introduction

In today's competitive world it is very necessary for the organizations to cope up with the dynamic environment, changing consumer preferences and demands. Thus, display of MI within organizations- be it public sector, private or any other- is a vital and comprehensive necessity (Thompson, 1999). According to the research conducted by Covin and Miles (1999), intrapreneurship displayed by individuals within organizations can be regarded as a new competitive advantage. It is very important that intrapreneurship is supported and encouraged across all the hierarchical levels within an organization (Kuratko, 2007). Display of MI within organizations leads to increase in profitability (Thornberry, 2001), development, revisions of strategies (Zahra, 1996), and value addition (Kuratko et. al., 2005).

While a lot have been discussed on how situational level constructs, such as: organizational environment, top management support, organizational culture and structure (Covin and Slevin, 1991; Kuratko et. al., 1990) affect MI; discussion on the impact of individual level competencies is limited. Here, competencies refer to the individual's mental capabilities that aid in the successful coping/adaptation in the face of difficulties posed by the external environment (Kanungo and Misra, 1992). Extant studies (e.g., Antoncic and Hisrich, 2003) have focused on situational/organizational factors or organizations as a whole to examine intrapreneurship, giving less attention to individual level competencies to further the understanding of MI within organizations. However, a segment of research has shown that individual competencies hold a lot of value when it comes to entrepreneurship (e.g., Sahin et. al., 2015; Sinha, 2017), as work environment which influences MI may change over time, but the rank order of individuals remains somewhat stable and the stability being argued to be associated with certain personality dispositions (George, 1992). Thus, discussion on individual competencies is important. Most existing work on individual intrapreneurship, discuss MI as a result of individuals' innovative, risk-taking and pro-active behavior (Miller, 1983; Zhao and Seibert, 2005; Brzozowski et. al., 2018) which can be regarded as cognitive competence as they include creative thinking, making inferences, coordination of multiple views etc. (Sun and Hui, 2006). However, some studies have indicated that intrapreneurship also includes all the activities related to discovery, assessment and exploitation of entrepreneurial opportunities (Cornwell, 1990 and Kuratko et. al., 2005) and individuals' emotional capabilities (Zampetakis et. al., 2009). Thus, ascribing intrapreneurship to only cognitive competence may hinder the understanding of the construct. The present study addresses these gaps in two ways- first, by highlighting the importance of individual level competencies to develop an understanding on the observed variations in MI levels between employees exposed to similar organizational conditions. Second, by positing MI as a behavior

resulting from not only individuals' "cognitive" competence but also from "affective" and "action-oriented" competencies, which add incremental value to an individual's efforts besides personality traits (e.g., Sahin et. al., 2015) based on the theory of entrepreneurial resourcefulness and empirical evidence.

The present study holds a lot of importance, as individuals are think-tanks within organizations who think across the boundaries of organizational units (Pinchot, 1985; Sinha 2021), which is important for the success of any venture. Individual level competencies help individuals to initiate such entrepreneurial behavior within organizations. These competencies help employees to participate to create new ventures within organizations rather than following the decisions of the top management; thus, making it a bottom-up approach (Åmo and Kolvereid 2005; Sinha and Srivastava 2013).

Additionally, researchers, like Goleman, (1998), Cross and Travegliane (2003), indicated that managerial effectiveness is influenced by emotional intelligence (EI). According to Goleman (2001), EI competencies represent the degree to which an individual has mastered specific skills and abilities that allow them greater effectiveness in the workplace. EI, has emerged as a new approach to explain variance in managerial performance. Being an individual level trait or phenomenon (Gartner et. al., 2003), EI has a role to play in the origins of entrepreneurship (Hermann et al., 2007). Evidences suggest that as it does not interfere with the inherit traits of personalities, so organizations can undertake training and development programs to develop EI in their employees (Dulewicz and Higgs, 1999), in order to encourage entrepreneurial behavior within organization. The above arguments make EI an imperative construct to be included in this study and examine its effect as a mediator in the context of MI.

It is also to be noted that there could be significant difference between competencies level in men and in women (Sinha, 2017; Rossi et al., 2013; Grewal and Salovey, 2005); thus, leading to significant difference in how they perceive opportunities and display entrepreneurial behavior within organizations. Similarly, managerial level may also affect MI within organizations (Floyd and Lane, 2000). While senior-level managers are responsible for articulating entrepreneurial strategies, vision and instigating the emergence of an organizational climate conducive to entrepreneurial behavior, middle level managers are those who need to understand the organizations goal and strategic entrepreneurial intent to communicate effectively with senior managers and promote the same to the first level managers, who have "adjusting, experimenting and conforming, roles" (Floyd and Lane, 2000), within organizations (Kuratko et al., 2005). Thus, this work, by examining the moderating effects of gender and managerial level on the relationship between individual level competencies and MI, provides organizations with better insights in devising proper strategic interventions to promote MI at workplace.

Research Objectives

- To examine the effect of three important individual level competencies: cognitive, affective and action-oriented on MI
- To study the mediating effect of TEI, on the relationship between individual competencies and MI within organization, and
- To test the moderating effect of gender and managerial level on the relationship between individual competencies and MI.

Theoretical Underpinnings and hypotheses building

Individual Level Competence and Managerial Intrapreneurship (MI)

Managerial intrapreneurship (MI) includes activities such as, creation and proliferation of new technologies or products/services, innovation of products/services, opening up to a new market or penetrating into an existing one (Powell and Baker, 2011) which strengthen organization's competitive position. However, organizations being a place where everything is normally ordered and controlled, developing and identifying entrepreneurial opportunities is a complex task. In such complex environment to display MI, one need to have a strategic vision, change orientation, ability to create an energetic work environment and cut red tape (Pearce, et. al. 1997). According to complexity theory (Anderson, 1999; Lewin, 1999; Stacey, 1995), stability (ordered hierarchical structure, rules, procedures etc.), instability (patterns of behavior that are unpredictable) and bounded instability (organizational behavior may not be possible to predict in advance, over the long term it develops uniformity or structure) are, the fundamental properties of innovative and creative systems and ''In order to produce creative, innovative, continually changeable behavior, individuals within systems must operate far from equilibrium where they are driven by negative and positive feedback to paradoxical states of stability and instability, predictability and unpredictability'' (Stacey, 1995, p. 478). Given the dynamic environment today in which businesses operate, it is important for them to be creative and continuously discover/rediscover themselves. According to Miller's (1983) to display creativity within organizations, individuals must embrace innovative, risk-taking and pro-active behavior. However, theory of entrepreneurial resourcefulness (Powell and Baker, 2011) suggests that MI not only involves innovative, risk-taking and proactive behavior but also simultaneous pursuit of opportunities and mobilization of resources that may or may not yet be within the entrepreneur's control (Stevenson and Jarillo, 1990). It also suggests that MI involves specific set of competence that

focus on conservation rather than consumption (McMullen, 2006). The resources could be financial, human or both. But liabilities associated with the "newness" do not allow intrapreneurs to get access of the scarce resources easily within and outside the firm (Stinchcombe, 1965). Thus, communication and networking skills also become vital besides risk-taking abilities and proactiveness. An intrapreneur must know how to acquire, assemble, enact and deploy firm's resources to generate additional value (Baker and Nelson, 2005). Further, the theory of entrepreneurial resourcefulness suggests that to display MI, a manager should be able to create a community or a forum of similar interests to promote his/her idea(s)/venture and capture larger chunk of market share (Powell and Baker, 2011). Based on the theory of entrepreneurial resourcefulness, Kanungo and Misra (1992), divided individual level competencies into three broad categories: cognitive, affective and action-oriented.

The first competence which leads to MI is *cognitive competence* which refers to the effective management of one's thought processes, beliefs and expectations. According to Schumpeter (1934), all entrepreneurial processes begin with an idea of creating something new and high expectancies lead to greater effort while low expectancy implies the converse (Vroom, 1964). While information about the market(s), stakeholders (customer, suppliers etc.) is scattered in the environment, not everyone is able to analyze and make sense of it. Individuals with cognitive competence have the ability to analyze and make sense of large volumes of information (Misra & Kumar, 2000). Unlike most of us, who feel that there exist not many entrepreneurial opportunities because if they did someone would have already seen them; entrepreneurs possess unique perspective and see opportunities worth pursuing (Misra & Kumar, 2000). Also, risk taking ability and tolerance to uncertainty are two of the important components of cognitive competence. Colton and Udell (1976), found that with respect to the

likelihood of starting a business, the risk scale is a better indicator than n'Ach and internal locus of control. The right amount of risk taken by individuals leads to increased returns for organizations (Birkinshaw et al., 2011).

The *affective competency* is the second competency which leads to MI. It refers to the management of one's emotional arousal. Simon (1987) suggested that under stress, our primitive urges take control of our behavior. Beglay and Boyd (1985) found that entrepreneurs are driven by the competitive desire to excel and succeed. According to Dubin (1956), work-oriented central life interest, motivates individuals to carry out their activities in given institutional settings which helps them show intrapreneurship. Also, dissatisfaction or frustration with the status quo leads to intrapreneurship (Brockhaus, 1982). Such dissatisfaction allows individuals to persevere at his/her goal, face hostile environment and overcome barriers to start with (Misra and Kumar, 2000). Zampetakis et. al. (2009) also indicated that individuals' emotional capabilities play an important role when it comes to intrapreneurship. Hence, management of one's emotional arousal becomes very important in order to channelize energy towards innovation and new venture creation.

The third competency is *action-oriented* competency. This refers to the management of individual intensions and actions that lead to MI. The role of an entrepreneur demands that she or he interact with numerous external agencies like the government, suppliers, resellers and venture capitalists as networking abilities will help in finding and acquiring the critical resources necessary for venture survival (Birley, 1985). Within organizations, managers should be able to allocate scarce resources properly and should be able to interact and network with various internal and external agencies in order to display intrapreneurship. Also, ability to take charge and lead employees in addition to being

the driving force behind the creation and establishment of a new venture within organization are important components of action-oriented competency (Misra and Kumar, 2000). Individuals with this competency may take control of the strategic resources (such as, capital and raw materials) necessary for driving new venture creation within organization, thus, displaying MI (Dollinger, 1995).

Thus, drawing from the theory of entrepreneurial resourcefulness when we look at the role of individual competencies in pursuing intrapreneurial activities within organizations, only cognitive dimensions namely, innovation, risk-taking and pro-activeness may not be sufficient. Besides cognitive competence, affective and action-oriented competencies (Misra and Kumar, 2000) would also be important. The intersection (the sweet-spot: Figure 1) of these three individual level competencies, lead to MI which is capable of unfolding innovation and new venture creation within organization.

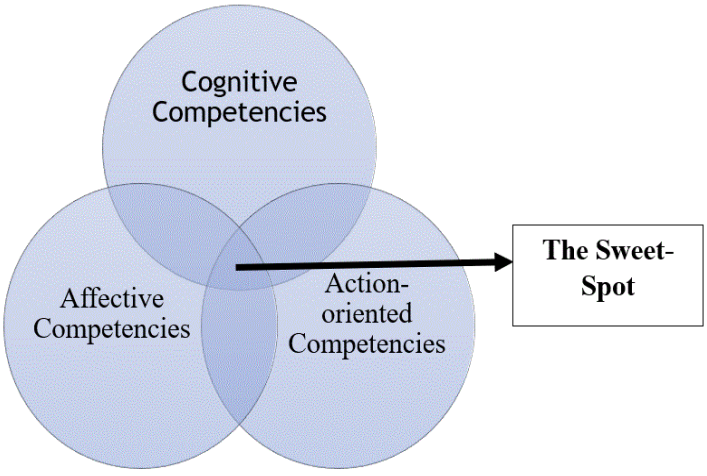

Figure 1

The Sweet-Spot (Intersection of Cognitive, Affective and Action-oriented Competencies)

Source: Adapted from Sinha (2021)

The present study examines the effect of all the three above-mentioned individual level competencies on MI within organizations.

H1: Individual level competencies (cognitive, affective and action-oriented) will predict MI within organizations

Personality and Managerial Intrapreneurship (MI)

Personality traits, are static constructs which refer to the basic and intrinsic quality and are not acquired competencies that is learned over a lifetime (Bono and Judge, 2004). Drawing on the Big-Five personality traits (John and Srivastava, 1999), extant study proposed that openness to experiences trait leads to display of entrepreneurship among managers and individuals having this trait are likely to be attracted to constantly changing environments and the novelty of new challenges (Kerr *et. al*., 2017); hence managers who are open to experiences would display MI. Zhao and Seibert (2006), suggested that managers with higher conscientiousness tend to display MI as they have greater achievement motivation. It is frequently hypothesized that those with high achievement motivation are drawn to environments in which success is more closely attributed to their own efforts (Kerr *et. al*., 2017). Another personality trait, extraversion is related to dominant, energetic, active, talkative, and enthusiastic (Costa and McCrae, 1992). But there lacks consensus on whether this trait is higher among managers who display MI or among individuals who do not (Kerr *et. al*., 2017). Some studies showed that there is no significant difference among individuals on trait extraversion when it comes to

MI (e.g., Zhao and Seibert, 2006) and some studies showed lower levels of trait extraversion among managers who display MI (e.g., Envick and Langford, 2000). However, as we have seen above that action-oriented competence required network building, marshalling of resources etc. we assume that extraversion would relate positively to MI. Further, it has been found that managers who display MI, may not do it to please anyone around them. Their efforts bring them laurels and profits to organizations. Hence, we hypothesis that trait agreeableness relates negatively to MI. Finally, Zhao and Seibert (2006) found that individuals displaying entrepreneurship are less neurotic, as they require exceptional self-confidence to take on the risks of starting a venture. Hence, we can say that trait neuroticism relates negatively to MI.

On the basis of the arguments presented above we hypothesize (Figure 2):
H2: Openness to experiences, conscientiousness and extraversion of Big-Five personality traits would relate positively to MI and agreeableness and neuroticism of Big-Five personality traits would relate negatively to MI.

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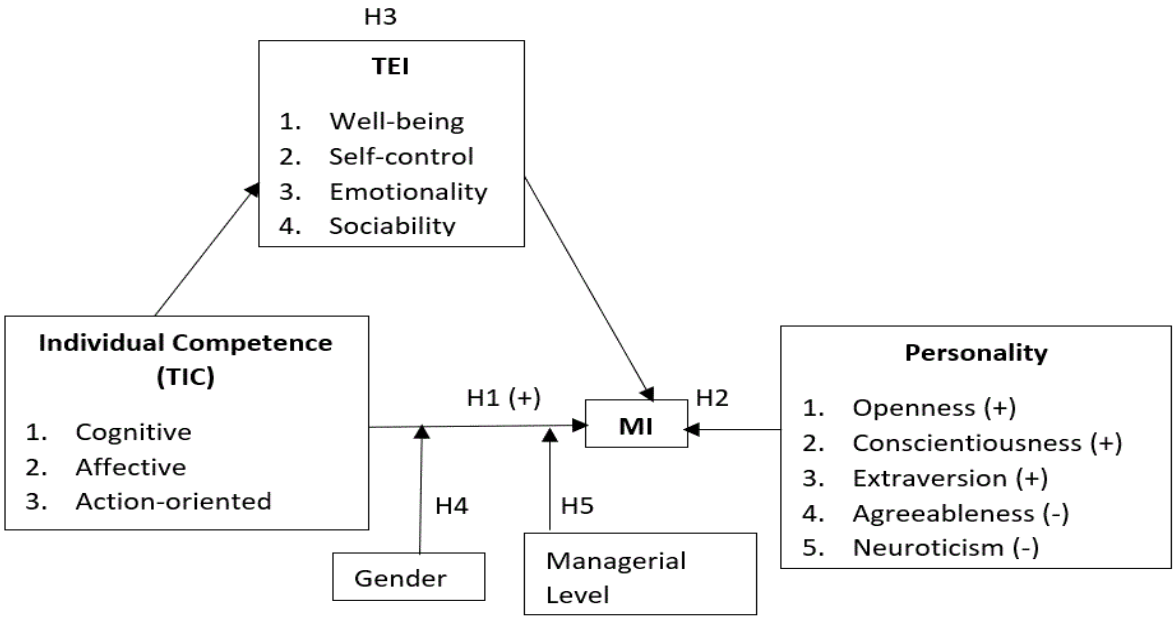

Figure 2

Proposed Research Framework

Note: (+) indicates proposed positive relationship between the constructs and MI; (-) indicates proposed negative relationship between the constructs and MI; H1 & H2 represents direct relationship; H3 represents mediating effect; H4 & H5 represent moderating effect

Trait Emotional Intelligence (TEI) in a Mediating Role

Emotional intelligence in its present manifestations was coined by Salovey and Mayer (1990). They described emotional intelligence as "a form of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and action". In a later attempt, they expanded their model and defined EI as the

ability of an individual to perceive accurately, appraise, and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth (Mayer and Salovey, 1997). Then noticeable work by Goleman (1995), in his book on the topic gained immense popularity and he defined EI as "the capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships". His model of EI comprised of five components: 1) self–awareness (having a deep understanding of one's emotions, strengths, weaknesses, needs, and drives). 2) self–regulation (the capability to regulate and manage one's emotions that saves them from being a slave to their own emotions). 3) Motivation (this extends to the deep inner desire to achieve for the sake of achievement). Motivated individuals want to achieve beyond their and everyone else's expectations. 4) Empathy: (this extends to the ability of an individual to be considerate and aware of other's feelings). Empathic individuals are also effective in retaining talent because they are able to develop a personal rapport with others. 5) Social skills: (this suggests the proficiency of an individual to manage relations and build networks and develop rapport). He formulated his model in terms of a theory of performance, and suggested that it has direct applicability to the domain of work and organizational effectiveness, particularly in predicting excellence in jobs of all kinds, from sales to leadership (Goleman, 1998b). Looking at the above-mentioned dimensions, logically, EI can be attributed as one of the important factors towards individual's capabilities to network in order to build rapport, access scarce resources etc., towards understanding people's motives and feelings and towards being attentive and self-aware in order to recognize underlying opportunities and one's own capabilities, so that possibilities of value addition and innovation are not lost and all these ultimately are important to display MI which is important in order to influence growth of organizations. According to Bird and Schjoedt (2009),

intrapreneurship is the outcome of the cognitions and emotions of entrepreneurial actors. Thus, when managers understand emotions (own's and other's) well, they can display entrepreneurial behavior within organizations in a better way. The opportunities are presented to many but how many individuals actually translate them and elicit sense? The study carried out by Foo (2011), state that emotions influence risk perceptions and preferences which are associated with EB. Some scholars suggested that positive emotion can cope with stress (Carver et. al., 2001), facilitate creativity and heuristic processing (Baron, 2008; Sinha, 2017), and also, can improve decision making (Foo, 2011). Similar studies (Baron, 2008; Biniari, 2011) have shown that emotions have a positive effect on entrepreneurial field. For the purpose of this study, Trait EI (TEI) also known as emotional self-efficacy has been used, which refers to a constellation of behavioural dispositions and self-perceptions concerning one's ability to recognize process and utilize emotion-laden information (Petrides and Furnham, 2006). TEI is a construct that is unrelated to capabilities, competencies, and skills. It is measured through self-report questionnaires and is considered as a personality trait, rather than a cognitive ability. It also measures how an individual think and behaves (Zampetakis et. al., 2009).

Piperopoulos (2010), asserted that TEI is the missing factor in the entrepreneurship research and also the development of entrepreneurship is related to an individual capability to analyze his/her emotions and values (Zakarevicius and Župerka, 2010). In particular, Zampetakis et. al. (2009) suggested that TEI has a positive effect on creativity which is one of the most important core competencies of entrepreneurs. Recent research findings indicated that emotional intelligence is a key component of strategic leadership capabilities and affects competitive advantage through leadership and strategic change (Voola et. al., 2004). Moreover, there is evidence that managers who possess TEI are capable of controlling their emotional displays and can motivate employees to display MI (Brundin et. al.,

2008). They can also impact innovation, creativity, and ultimately the performance and competitiveness of the organization (Piperopoulos, 2010). Employees with high TEI are more capable at regulating their emotions (Wong and Law, 2002) and therefore experience more confidence and control over work environment requirements, which in turn enables them to display MI. Mair (2005) has argued and empirically demonstrated that a manager's ability to monitor his or her own feelings and thoughts has a positive effect on MI exhibited within an organization. TEI affects MI through two key processes. First, the self-evaluations of emotional efficacy. Employees high in self-perceived TEI may exhibit high tolerance to stress and environmental stressors (Nikolaou and Tsaousis, 2002). Therefore, they are more adept at appraising and regulating their own emotions. For example, employees high on TEI exhibit high tolerance to environmental stressors (Nikolaou and Tsaousis, 2002), identifying feelings of frustration and subsequently regulating those emotions to reduce stress, thereby increasing their levels of intrapreneurship with organization (Zampetakis et. al., 2009). Second, individuals with high self-perceived TEI tend to have higher affectivity, proactive and creative dispositions and thus facilitating MI within organization (Zampetakis et. al., 2009). For example, there is evidence that positive trait affectivity may lead to higher creativity and proactivity (Amabile et al., 2005). As individuals with high TEI understand self and other's emotions nicely, it becomes easy for them to network, communicate and negotiate (Petrides and Furnham, 2006) in order to get hold of strategic resources necessary for new venture creation (Dollinger, 1995). So, it is imperative to study the mediating effect of TEI on the relationship between individual level competencies and MI within organizations. Thus, we hypothesize:

H3: TEI will mediate the relationship between individual level competencies and managerial intrapreneurship

Gender and Managerial Intrapreneurship

Research indicates that there are still differences between men and women entrepreneurs. The reasons seem to be the lack of specific business skills, the less extensive social network, and the lack of identification patterns among women. These differences can be explained by the fact that women still have fewer opportunities to make a career (Rossi et. al., 2013, Sinha, 2012). A study by Adachi (2015), to display intrapreneurship within organization one may have to spend more time for the organization. Becker (1985), argues that married women invest less in their human capital than married men do even when they work for the same number hours because women would be mainly responsible for child care and other household activities. In addition, women may be treated unequally in workplace (Cotter et. al., 2001). A study conducted by Galloway *et. al*. (2002), suggested that females tend to maintain traditional domestic roles alongside their professional ones. Females, more often than their male peers, are simultaneously exposed to family and job-related stressors as a result of their dual roles as mothers and professionals (Roxburgh, 1996; Simon, 1995). They also tend to face gender-specific resistance in their efforts to reach the highest echelons in organizational hierarchies (‘‘glass ceiling effect’’; see Cotter et. al., 2001).

Also, a few studies which associate gender with MI indicated that there exist no significant differences between men and women intrapreneurship and that both men and women are equally capable in identifying potential opportunities, communicating effectively, using network and organizational resources more efficiently and effectively but due to lack of actual opportunities available, work-life balance and tendencies to maintain traditional domestic roles, women compromise with intrapreneurship within organization (Adachi and Hisada, 2015; Sinha, 2012).

Thus, we hypothesize:

H4: Gender moderates the relationship between TEI and MI within organizations

Managerial Level and Managerial Intrapreneurship

Research evidences (Boyatzis et. al., 2000), showed that the individual level competencies are capable of differentiating outstanding from average performers in many countries of the world. Theory suggests that career success is associated with non-cognitive interpersonal and intrapersonal skills and success depends on several intelligences and the ability to manage oneself (e.g., Salovey and Mayer 1990). According to Goleman (1998), while IQ (cognitive competence) serves as the entry level requirement for executive positions, managing one's feelings of withdrawal and depression (affective competence), helps in problem solving and coping up with the challenges (Kanungo and Misra, 1992) and is the sine qua non of leadership. So, it can be deduced that people at higher managerial levels would have higher individual level competencies and using organizational opportunities and resources for intrapreneurship would be somewhat more expected from them. However, research show that middle-level managers are the hub through which most organizational knowledge flows (Floyd and Wooldridge, 1992). While senior-level managers are responsible for articulating entrepreneurial strategies, vision and instigating the emergence of an organizational climate conducive to entrepreneurial behavior, middle level managers are those who need to understand the organization's goal and strategic entrepreneurial intent to communicate effectively with senior managers and promote the same to the first level managers within the organization (Kuratko et. al., 2005). They champion and guide the intrapreneurship within organization that originate from the first level managers and voice for higher level support. Whereas, Floyd and Lane (2000), suggested that first level managers have adjusting (responding to recognized and unplanned entrepreneurial challenges), experimenting

(initiating MI within organization) and conforming (adaptation of operating policies and procedures, endorsed by higher managerial levels), roles within the organization. Thus, one can conclude that although support for intrapreneurship within organization initiates from senior level management but they themselves act like ordered structures and most of the experimenting happens at the entry level/first managerial level which is endorsed by middle level managers, if they conform to the organizational entrepreneurial intent. So, we hypothesize:

H5: Managerial levels moderate the relationship between TEI and MI within organizations

Research method

Sampling Method and Size

Representative sample of 204 managers, identified through researcher's personal contact and working at various managerial levels (first, middle and senior) served as respondents for the study. Non-probabilistic sampling method: convenience sampling was considered to draw respondents from the population as it provides 'convenient' sources of data for researchers and also does not involve known nonzero probabilities of selection (Lavrakas, 2008). These Managers were from different service sector organizations and worked in banking, health, education etc. across India. They all were approached individually, and were requested to participate in this study. After their consent, the final questionnaire, made using 'Google form' was administered through e-mails.

Participants

The units of analysis for this study were managers, working at various managerial levels, across service sector organizations in India. The managers in the sample included 62 female (30.4%) and 141 males (69.1%). Within the sample, 69% respondents were post graduate, 25% were graduate and 6%

were having doctorate degree. In terms of managerial experience, 81.5% respondents were having 1 to 5 years of experience, while 10.2% were having 6-10 years of experience. 6.5% respondents were having 11 to 15 years and 1.9% was having experience more than 26 years. Among the respondents, 55.6% worked at entry level management, 36.1% at mid-level and 8.3% of respondents reported being working at senior level management positions.

Procedure

In order to guarantee anonymity and confidentiality of respondents, individual emails, explaining the purpose of the survey were sent to 350 managers. After receiving their consent to participate in the survey, final questionnaire was administered to the participants. The questionnaire contained adequate instructions and we further assured respondents' anonymity by informing them that there were no right or wrong answers. This should reduce respondent's apprehension on being evaluated on their responses (Ayyagri, 2007). Besides the questions relating to the study constructs, the instrument also included a few demographic questions related to age, gender, education, managerial experience, managerial level and sector employed with. Google form was used to prepare the final survey. Total 219 responses were received, in which 15 responses were found to be incomplete. So, only 204 responses were considered for final analysis. Thus, the final response rate remained 58.28%.

Since, the self-reporting way of data collection was used, common method bias may pose a threat to the validity of a study (Ayyagari *et. al*., 2007), careful consideration was given to controlling bias due to the common method used for data collection. The study achieved this by providing material/facts appropriate for the respondents, which was not directly relevant to the research phenomenon, such as: creating sections between predictor and criterion variable and using phrases (Podsakoff *et. al*., 2003),

such as “You are more than half-way through the survey...Thank You for your participation as we research this important issue” and “You have almost finished”. After completing the survey, participants were thanked for taking part in this study. The participation of managers in the present study was voluntary. The study also calculated Variance Inflation Factor (VIF) values of the constructs to check for multicollinearity. All VIF values (1.18–2.46) were found to be well below the threshold of 4.0 and all tolerance levels were found to be above 0.64. According to Fox (1991), a VIF above 4.0 or tolerance level below 0.25 may indicate potential for multicollinearity; thus, the concerned appeared to be minimal and collinearity was not an issue in our model.

Measurement of Theoretical Constructs

Existing and popular instruments were used to measure the theoretical constructs in the study to enhance validity (Stone, 1978). However, a pre-test was undertaken to further enhance the content validity of the instrument. For this we cross verified them with the extant literature and the experts. The experts were four management faculties of reputed institutes of India having expertise in this field of study who gave feedback on the developed questionnaire. This ensured that the items in the questionnaire captured the meaning of the constructs. All the constructs were assessed with self-report measures based on multi-item scales. Responses to all items were measured on 5-point Likert scales from completely disagree (1) to completely agree (5).

Emotional Intelligence: To measure EI Trait Emotional Intelligence Questionnaire (TEIQue) was used (Petrides and Furnham 2006). It’s a self-report questionnaire of EI having 30 items. As argued by Petrides et. al. (2007), this questionnaire provide coverage, of variable quality and adequacy, of emotion- related personality traits, self-perceived abilities and behavioural dispositions. Indeed, every

study that has compared the TEIQue to other EI questionnaires has concluded that it has superior predictive validity and superior psychometric properties more generally (Freudenthaler, et. al. 2008; Martins et. al., 2010).

It also has four priori factors, Well-Being (six statements), Self-control (six statements), Emotionality (eight statements) and Sociability (six statements). The well-being construct included statements, like: "I feel that I have a number of good qualities", "On the whole, I'm pleased with my life"; self-control construct included statements like: "I tend to change my mind frequently", "On the whole, I'm able to deal with stress"; emotionality construct included statements like: "Expressing my emotions with words is not a problem for me", "I often find it difficult to see things from another person's viewpoint" and sociability constructs included statements like: "I can deal effectively with people", "I often find it difficult to stand up for my rights".

Individual level competencies: Misra and Kumar's (2000), 15 item self-report, entrepreneurial resourcefulness scale was used to measure EB, which is based on three competencies- cognitive, affective and action-oriented. This treats EB as the outcome and not as a study of personality. Cognitive competence included six questions like: "Do you have the ability to analyze and make sense of large volumes of information?", "Do you have the ability to take risk?" Affective competence included five questions like: "Do you have the ability to persevere?", "Do you face dissatisfaction with status quo" and action-oriented competence included four questions like: "Do you have the ability to take charge and lead employees?" and "Do you have the ability to find, marshal and control resources?"

Managerial intrapreneurship: The construct was assessed using ten items from the Pearce et al. (1997) measure of entrepreneurial behavior. Previous research (e.g., Zampetakis and Moustakis, 2007) has provided validation evidence for this scale. The provided four facets of MI: strategic vision, creation of an energetic working environment, change orientation and the ability to cut red tape. Sample items were: ‘‘I display an enthusiasm for acquiring new skills’’, ‘‘I create a co-operational and team working climate in my department in order to meet a challenge’’ and “I boldly move ahead with new approaches for the way I do thinks when my colleagues might be more cautious”.

Personality: We used the 44-item Big-five personality traits which has shown good psychometric properties, as well as considerable convergent and discriminant validity with longer Big Five measures by (John and Srivastava, 1999). It includes short items that were selected from Big Five prototype definitions (Benet-Martinez & John, 1998). Appropriate adjectives in the form of statements were neatly arranged to measure Big-five personality dimensions. To measure ‘openness’ the scale included 10 items (e.g., “I see myself as someone who values artistic, aesthetic experiences”). To measure ‘conscientiousness’ the scale included 9 items (e.g., “I see myself as someone who does things efficiently”). To measure ‘extraversion’ the scale included 8 items (e.g., “I see myself as someone who is talkative”). To measure ‘agreeableness’ the scale included 9 items (e.g., “I see myself as someone who is considerate to almost everyone”). And to measure ‘neuroticism’ the scale included 8 items (e.g., “I see myself as someone who worries a lot”).

Control Variable

The study controlled for age, education, tenure and managerial experience. Some studies have shown that age, tenure and experience may have some effect on MI. There has been an increasing interest

from researchers in the role of an individual tenure within an organization in explaining important organizational aspects such as job performance (Sturman, 2003). Tenure reflects "organization socialization" and "organization experience" (Sturman, 2003); thus, individual with higher tenure may reflect lesser need for recognition in order to display intrapreneurship as compared to individuals with lesser tenure (Zampetakis et. al., 2009). While, employees with high tenure, would have established friendship and would be well aware of organizational functioning, employees with less tenure would face a whole lot of cultural norms and role expectations (Zampetakis et. al., 2009); thus impacting MI. Additionally, studies have reflected that age affects entrepreneurship and that younger people display higher levels of entrepreneurship. At younger age, educated individuals have the capacity to think big and take risk. Moreover, they are also technology friendly (Kerr et. al., 2017). Education and experience also have been shown as factors affecting MI (Parker, 2009). People with higher levels of education and experience can think of taking bigger risks and reaping greater returns (Parker, 2009). Thus, these variables have been controlled for in this study for greater accuracy of results.

Analysis

IBM's SPSS 20.0 was used. For the purpose of analysis, variables named, TTEI (total TEI- mean value of all 30 items), MI (mean score of 6 items), well-being (mean score of 6 items), self-control (mean score of 6 items), emotionality (mean score of 8 items), sociability (mean score of 6 items), cognitive competence (mean score of 6 items), affective competence (mean score of 5 items), action-oriented competence (mean score of 4 items), TIC (total individual competency mean score of 15 items), personality (mean score of 44 item), Openness (mean score of 10 items), conscientiousness (mean score of 9 items), extraversion (mean score of 8 items), agreeableness (mean score of 9 items) and neuroticism (mean score of 8 items) were computed. Sample was found to be normally distributed,

so, parametric tests, such as hierarchical multiple regression and partial correlation test was performed to measure the magnitude and direction of the relationship between TIC and MI and also to test the mediating effect of TEI and moderating effects of gender and managerial level on the relationship between TIC and MI.

Analysis and findings

The Kolmogorov-Smirnov Z-test indicated normal distribution. Also, test of reliability showed, Cronbach's alpha 0.825 for TTEI, 0.867 for MI, 0.723 for well-being, 0.731 for self-control, 0.762 for emotionality, 0.798 for sociability, 0.795 for cognitive competence, 0.763 for affective competence, 0.836 for action-oriented competence, 0.792 for TIC, 0.77 for openness to experiences, 0.79 for conscientiousness, 0.84 for extraversion, 0.79 for agreeableness and 0.81 for neuroticism. The study also found that TIC is significantly related to MI, with correlation coefficient 0.544 ($p=0.000$), after controlling for age, education, managerial experience and tenure, using Partial correlation. Also, personality traits didn't show strong correlation with priori factors of TEI and TIC, thus making it a distinct construct to be studied in this context.

Figure 3 presents the means, standard deviations, and inter-correlations of the study variables. First, it is worth noting that significant positive correlations exist between all the study variables. Second, dimension of TEI and individual level competencies relate differently to managerial intrapreneurship. While, well-being relates moderately to MI ($r= 0.480$, $p<0.01$), self-control was found to be weakly correlated to MI ($r= 0.248$, $p<0.05$) to MI though significant. Similarly, cognitive competence was moderately related to MI ($r=0.610$, $p<0.01$), followed by action-oriented competence ($r= 0.598$,

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p<0.01) and affective competence (r= 0.529, p<0.01). Thus, the correlation results provide preliminary support for hypotheses.

	Mean	Std. Dev	TTEI	TIC	MI	Well-being	Self-control	emotionality	sociability	Cognitive	Affective	Action-Oriented	Personality	TO	TC	TE	TA	TN
TTEI	4.65	0.665	1															
TIC	4.66	0.675	0.442	1														
MI	4.96	0.796	.563**	0.544**	1													
Well-being	5.13	0.879	.739**	0.356**	.480**	1												
Self-control	4.3	0.958	.682**	0.121*	.248*	.354**	1											
emotionality	4.63	0.856	.813**	0.342**	.448**	.477**	.400**	1										
sociability	4.32	0.794	.635**	0.351**	.395**	.333**	.286**	.423**	1									
Cognitive	4.91	0.957	.458**	0.738**	.910**	.386**	0.222	.344**	.339**	1								
Affective	4.87	0.784	.503**	0.768**	.829**	.433**	0.241	.489**	.276**	.663**	1							
Action-Oriented	5.15	1.056	.490**	0.763**	.798**	.422**	0.171	.337**	.390**	.574**	.497**	1						
Personality	5.39	0.886	.211**	0.278**	.398**	.269**	.160*	.281**	.290**	.389**	.391**	.382**	1					
TO	5.15	0.679	.201**	0.266**	.348**	.231**	.156*	.252**	.276**	.353**	.366**	.363**	0.784**	1				
TC	4.66	0.761	.242**	0.243**	.389**	.254**	.159*	.275**	.285**	.373**	.378**	.379**	0.786**	0.578**	1			
TE	4.79	0.774	.212**	0.221**	.347**	.250**	.147*	.261**	.270**	.363**	.369**	.369**	0.811**	0.532**	0.544**	1		
TA	5.11	0.879	.202**	0.235**	.338**	.267**	.139*	.248**	.256**	.343**	.351**	.352**	0.799**	0.598**	0.532**	0.453**	1	
TN	4.69	0.932	.213**	0.217**	.326**	.266**	.138*	.242**	.248**	.333**	.342**	.341**	0.782**	0.543**	0.433**	0.467**	0.459**	1

Note: **Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); N=204; TTEI-Total trait emotional intelligence; TIC- Total Individual Competencies; MI- Managerial Intrapreneurship; TO- Total Openness to experiences; TC- Total Conscientiousness; TE- Total Extraversion; TA- Total Agreeableness; TN- Total Neuroticism.

Figure 3: Means, Standard Deviations and Inter-correlations of Variables

To get further clarity and test the study hypotheses, regression analyses were conducted.

Individual level competencies and Personality Traits as predictors of MI: Assuming a linear model, MI was regressed on TIC in order to examine the first hypothesis (H1). TIC explained a significant amount of variance in MI ($R^2 = 0.388$, $p<0.05$) and was found to be a significant predictor ($\beta = 0.674$, $p < 0.05$) of the same, thus, providing support for H1. Next, hierarchical regression method was employed, to examine whether TIC offers additional explanatory power in the prediction of MI over personality traits. So, in step 1, MI was regressed on control variables, in step 2, on personality traits and finally in step 3, it was regressed on TIC. it was found that personality traits were able to explain 19% variance in MI with openness to experience ($\beta= 0.17$, $p< 0.05$), conscientiousness ($\beta = 0.23$, $p< 0.05$) and extraversion ($\beta= 0.13$, $p< 0.05$) relating positively to MI, while agreeableness ($\beta= -0.06$, ns) and neuroticism ($\beta= -0.03$, ns) relating negatively. Thus, providing support for H2. The results also showed that TIC explained a significant amount of variance in MI ($R^2 = 0.341$, $p<0.05$) over personality traits, with $\Delta R^2= 15$ percent. Affective competence ($\beta= .38$; $p < .001$), cognitive competence ($\beta= .39$; $p < .01$), and action-oriented competence ($\beta= .39$; $p < .001$) were significant predictors of MI. (Table 1). It is also to be noted that, after introducing TIC in step 3 only trait conscientiousness was found to be significant with $\beta = 0.20$ and p-value < 0.05.

Table 1: Individual Level Competence as Predictor of Managerial Intrapreneurship over and above Personality Traits

Variables and Statistics	**β for MI**		
	Model 1	Model 2	Model 3

Step 1			
Age	-.21*	-.23*	-.24*
Educational	-.12	-.05	-.02
Qualification	.07	.05	.08
Managerial Level	.17	.16	.16
Tenure			
Step 2			
		.17**	.10
TO		.23**	.20**
TC		.13**	.09
TE		-.06	-.03
TA		-.03	-.01
TN			
Step 3			
Cognitive			.395**
Affective			.382***
Action-oriented			393***

		.192	
R^2	.008	.084	
Adjusted R^2	.027	2.46**	.341
F Value	.244	.184	.298
R^2 Change	-	3.14***	7.412***
F Change	-		.150
			12.909**
			*

*p< 0.05; **p< 0.01; ***p< 0.001 (2-tailed); The betas (β) reported are based on standardized coefficients; N= 204; Refer to Figure 3 for description of abbreviations.

Mediating effect of TTEI: To examine H3, multiple regression tests were performed. To determine whether TTEI was mediating the relationship between TIC and MI, we followed the procedure recommended by Baron and Kenny (1986). They suggested that in order to establish the mediating effect of a construct, four regression equations should satisfy the tests of the linkage of the mediator model. First, the independent variable (TIC) should be related to the dependent variable (MI). second, the independent variable (TIC) should be related to the mediator (TTEI). Third, the mediator (TTEI) should be related to the dependent variable (MI). Fourth, the relationship between independent variable (TIC) and the dependent variable (MI) will be reduced (partial mediation) or no longer be significant (full mediation) when controlled for the mediator (TTEI). Table 2 summarizes the results of regression analysis to test the mediation effect.

Table 2: Mediating Effect of TEI

	Independent Variables	Dependent Variables
Step 1	**TIC**	**TTEI**
	R^2	0.442*
	F value	0.142
		17.828*
Step 2	**TTEI**	**MI**
	R^2	0.563*
	F value	0.180
		24.843
Step 3	**TIC**	**MI**
	TTEI	0.287*
	R^2	0.208*
	F value	0.398
		27.603*

Note: * $p<0.05$

Here, H1 was already tested and TIC was found to be a significant predictor of MI. Additionally, TIC was related to TTEI (Table 2) with $\beta= 0.442$ and $p< 0.05$. Further, TTEI was also related significantly to MI with ($\beta= 0.563$, $p<0.05$; Table 2). Thus, proceeding to the final step, from Table 2, it was clear

that β- value for the influence of TIC on MI decreased from 0.388 ($p<0.05$) to 0.287 ($p< 0.05$) on controlling for TTEI in the regression model (step 3). Hence, it can be deduced that TTEI partially mediated the relationship between TIC and MI; thus, H3 is partially supported.

The extant literature showed and explained the significant role of TEI in predicting intrapreneurship (Sinha, 2017). However, the study found only partial mediation of TEI. Thus, it made sense to check how each dimension of TEI was related to MI and to the dimensions of TIC. The results have been presented in Table 3. It was found that that the self-control dimension of TEI was not predicted by any of the dimensions of TIC and it also came out to be an insignificant predictor of MI ($\beta= 0.026$, $p>0.05$). Such deviation can be attributed to the competition at workplace where everyone works under stress in order to get favorable appraisal and aggression at workplace has somewhat become a common phenomenon. The results have been discussed in subsequent section.

Table 3: The Regression Result for Dimensions of TEI

Dimension	**Sig.**	**Std. Coefficient**
Well-being: Dependent Variable		
Cognitive	0.597	0.066
Affective	0.028	0.263
Action-oriented	0.021	0.254
$R^2= 0.241$, $p<0.05$		

Self-control: Dependent Variable		
Cognitive	0.799	0.096
Affective	0.986	0.152
Action-oriented	0.582	0.054
R^2= 0.066, p>0.05		
Emotionality: Dependent Variable		
Cognitive	0.864	-0.021
Affective	0.000	0.437
Action-oriented	0.223	0.132
R^2= 0.251, p<0.05		
Sociability: Dependent Variable		
Cognitive	0.240	0.155
Affective	0.798	0.032
Action-oriented	0.013	0.285
R^2= 0.172, p<0.05		
MI: Dependent Variable		
Well-being	0.019	0.258

Self-control	0.799	0.026
Emotionality	0.048	0.224
Sociability	0.028	0.244
R^2= 0.213, p<0.05		

Moderating effect of Gender- To examine the H4 hypothesis we used hierarchical regression model, in accordance with Cohen and Cohen (1983). In Step 1, MI was regressed on Gender. This was followed by Step 2, where we introduced TIC into the regression model along with Gender as independent variables. Finally, in Step 3, we introduced the interaction term (TIC X Gender) into the equation. The results, in Table 4, indicated that the regression coefficient of the interaction term was non-significant (β = 0.007, ns); thereby it was inferred that Gender did not moderate the relationship between TIC and MI within organization. Thus, H4 was not supported.

Table 4: Moderating effect of Gender

Model		Regression Coefficients		Standardized Coefficients			
		B	Std. Error	Beta	t	Sig.	R Square
1	(Constant)	4.961*	.078		63.237	.000	
	Gender	.002	.079	.002	.022	.983	.000
2	(Constant)	4.961*	.065		76.123	.000	
	Gender	.011	.065	.013	.162	.872	

	TIC	.448*	.065	.563	6.841	.000	.317
3	(Constant)	4.961*	.066		75.729	.000	
	Gender	.010	.066	.013	.159	.874	
	TIC	.447*	.068	.561	6.557	.000	
	Moderator	.006	.076	.007	.082	.935	.317

Note: * $p<0.05$

Moderating effect of Managerial Level- To examine the H5 hypothesis we used hierarchical regression model, in accordance with Cohen and Cohen (1983). In Step 1, MI was regressed on Managerial Level. This was followed by Step 2, where we introduce TIC into the regression model along with Managerial Level as independent variables. Finally, in Step 3, we introduce the interaction term (TIC X Managerial Level) into the equation. The results, in Table 5, indicated that the regression coefficient of the interaction term was non-significant ($\beta = 0.002$, ns); thereby it was inferred that Managerial Level did not moderate the relationship between TIC and MI within organization. Thus, H5 was not supported.

Table 5: Moderating effect of Managerial Level

Model	Regression Coefficients	Standardized Coefficients	t	Sig.	

		B	Std. Error	Beta			R Square
1	(Constant)	4.961*	.078		63.607	.000	
	Managerial Level	.086	.078	.108	1.094	.276	0.012
2	(Constant)	4.961*	.065		76.150	.000	
	Managerial Level	.021	.066	.026	.315	.753	
	TIC	.445*	.066	.559	6.723	.000	0.317
3	(Constant)	4.961*	.066		74.865	.000	
	Managerial Level	.021	.067	.026	.307	.759	
	TIC	.445*	.067	.559	6.688	.000	
	ModeratorML	.002	.071	.002	.025	.980	0.317

Note: * $p<0.05$

Discussion

This study shows that TIC (cognitive, affective and action-oriented competencies) was able to explain variance in MI over personality traits. Thus, the study reaffirms that the individual-level competencies are significant to display MI (Bird 1998; Baum et. al., 2001; Brundin et. al., 2008; Piperopoulos, 2010) within organization. A higher TIC score indicates higher cognitive, affective and action-oriented competencies, which are vital to understand and regulate thoughts, emotions, overcome anxiety and nervousness quickly. Individuals with high cognitive competence can take risks and are proactive

(Miller, 1983; Sinha 2021). The results clearly showed that when it comes to MI, risk-taking, innovation, making sense of equivocal realities, analyzing large volumes of information and tolerating uncertainties (components of cognitive competence as discussed above) play a very important role. Individuals with high action-oriented competence can communicate effectively, influence external agencies (government, suppliers, investors, etc.), can identify and marshal scarce resources well (Misra and Kumar, 2000), and establish strong networks which is significant to display MI within organizations. Individuals with high affective competence can enhance their emotional self-awareness to mobilize resources and pursue their goals and objectives, thereby achieving better performance (Boyatzis et. al., 2000; Goleman, 1998). It helps managers to manage their emotional arousal and keep a check on the primitive urges which take control of behavior when an individual is under stress (Simon, 1987). Thus, helping managers to control feelings of withdrawal and depression (Clore et. al., 2001), increases self-efficacy, builds capability to handle and understand perspective/viewpoint of others. This is imperative to display MI within organization as working on processes/activities which are novel can cause anxiety and stress (Omrane et. al., 2018). Therefore, the findings of the study are in line with previous seminal works and indicates that managers displaying high TIC are assertive (Bar-On, 1997), which helps them to manage conflict (Godsey and Thingujam, 2010), negotiate effectively and show high level of bottom-line leadership performance (Atwater and Yammarino, 1992; Sosik, 2001) to undertake intrapreneurial activities within organizations. However, very interestingly, the study indicated that TEI was partially mediating the relationship between individual level competencies and MI within organization. Specifically, the self-control dimension was not related to the factors of TIC and MI. This might be attributed to the fact that within organizational competitive environment, working in stress is common and people possess higher desire to excel. So, “getting into someone’s shoes and feeling their emotions”, “being relaxed at workplace” or “following

a set behavioral pattern" (components of self-control dimensions under TEI questionnaire) etc. do not seem to be contributing much towards MI within organization. This supports, McClelland's entrepreneurial theory of need of Achievement (McClelland, 1965), where an individual displaying MI holds high desire for significant accomplishment, mastering of skills, controlling and marshalling resources, and displaying high work-standards. Such individuals display intense, prolonged and repeated efforts to accomplish something difficult. It also indicated people's inclination towards the instability factor of complexity theory (Anderson, 1999; Lewin, 1999; Stacey, 1995) where innovation and MI are results of unstructured and unordered behavior; thus, restricting the role of self-control. Additionally, well-being and sociability factors of TEI related significantly to MI (Table 3). This indicated that individual's past experience, happiness (Clore et. al., 2001), self-efficacy, influencing capabilities, relationship building skills and firmness effect their abilities to figure out various opportunities present within the workplace and helps managers to challenge the status quo, thus, allowing them to display MI within organization. While it is clear that the personality traits exert an impact on MI, this study also showed that the role of individual competencies is more significant (Table 1). This is in line with past research findings that pointed out towards incremental value of individual competencies over personality and other demographic constructs (Ramos et al., 2007) in predicting MI. Findings of this study indicated that to display MI within organization it is important for managers to employ a wide scope of understanding in how resources are brought (Sonenshein, 2014), put together, presented (Baker and Nelson, 2005) and deployed (Penrose, 1959) to a generate various forms of value. This study empirically showed that the individual level competencies have the capacity to add incremental validity over personality traits in predicting MI. They have the ability to make any organization a 'learning organization' which is capable of displaying higher levels of

innovation which results in outstanding performance (Goleman, 1998) for both individuals and organizations.

Further, this study also demonstrates that gender does not moderate the relationship between TIC and MI (Table 4). However, Brush (1992), suggested that there lies some difference between men and women entrepreneurial behavior within organizations, because of the glass ceiling and their personal and business profile. Although it's been found that favorable environment enhances MI among women (Rossi et. al., 2013), which is in line with this study. This study also indicated that managerial level does not moderate the relationship between TIC and MI (Table 5). This indicates that when organizations provide their employees with the proper environment and motivation the MI becomes evident reaffirming the studies by Hornsby el. al. (2002). Also, Rigtering and Weitzel (2013), suggested that individuals' participation at work, available resources at their disposal and their trust in managers lead to higher levels of MI within organization, hence leading organizations towards growth. This study could be one of the answers to why some of the managers despite being bestowed upon with the opulent opportunities fail to scale up and some work wonders. This study is in line with the previous results which suggest that individual level competencies can affect intrapreneurship (Mair, 2005; Zampetakis et. al. 2009).

Implication of the study

Theoretical Implications

This study contributed to the literature by exploring and focusing on the effect of individual level competencies, TIC on managerial intrapreneurship. This is important as past evidences suggest that work environment which influences MI may change over time, but the rank order of individuals

remains somewhat stable, the stability being argued to be associated with certain personality dispositions (George, 1992). The positive effect of TIC on MI also indicated that "awareness of individual differences in affective self-evaluations is important" (Zampetakis et. al., 2009) for the promotion of intrapreneurship within organizations. Additionally, the study empirically established the incremental effect of TIC in explaining the variance in MI over and above personality traits. With very limited empirical work in this area, this study provides a solid ground to look into the effects of TIC on MI over and above personality traits in various other research contexts and methods like: group discussion and role play. Second, many studies have considered MI as a result of cognitive competency (Miller, 1983; Brzozowski et. al., 2018). However, this paper presents a comprehensive view of MI, which is not about only cognitive competency but also action-oriented and affective competencies (Misra and Kumar, 2000; Sinha, 2021). By presenting an empirical evidence on the role of TIC on MI, this paper creates a solid ground for further validation of the results. The results obtained by assessing the moderating effects of gender and managerial level also provides an interesting ground for further research, as their effects were found to be insignificant. Previous studies have shown the moderating role of gender and managerial level (e.g., Parker, 2009) on entrepreneurship.

Practical Implications

The study also holds some practical implications for academics and practitioners. The study shows that TIC has a positive effect on MI within organizations over personality traits. Organizations by understanding and nurturing such individual competencies can work towards organizational growth by furthering innovative practices. It is clear that managers are likely to differ in their ability and willingness to self-regulate emotions, thoughts and behavioral tendencies that may help or hinder

effective MI (Kanungo & Menon, 2004). Therefore, measurement of individual competencies can provide useful information on what kinds of interventions are necessary in managerial training programs. The study will help organizations in staffing right kind of people and provide them right kind of training. Academics may further explore the underlying factors using the foundation that this study provides to understand MI and effect of individual level competencies on MI within organizations.

Also, analyses indicated that all three factors of Trait EI (Well-being, Emotionality, and Sociability) except Self-control are related to managerial intrapreneurship (MI) within organizations. This might indicate that managers with higher emotional intelligence can be expected to discover and exploit opportunities better. The study suggests that managers' ability to understand and regulate his/her as well as others' emotions would influence their entrepreneurial behavior and their success within organizations as compared to those who fail to do the same (Bahadori, 2012). Further, as compared to other aspects of personality, individual competencies can be enhanced through training (Goleman, 1995; Kanungo and Misra, 1992). According to Boyatzis et. al., (2000), competencies which are capable of serving as a basis for coping with challenging situations can be learned. Thus, it is subject to change as an individual accumulated experience over time (Kanungo & Misra, 1992). In this vein, providing necessary training to managers might improve and develop their intrapreneurial behavior within organizations and also might help them to handle workplace stress. For example, Slaski and Cartwright (2003), observed a dramatic increase in trait EI and a decrease of stress-related factors in a group of 60 British managers who received explicit EI training (which included a series of short lectures, group discussion, role playing, and sharing of emotional experiences), compared to a matched control sample who received no training. Such trainings would help managers to hone greater

cognitive, affective and action-oriented competencies to build relationships with all the stakeholders which would attract new customers, would enhance customer bonding, would help in retaining existing customers and would also enhance service delivery. Nurturing individual level competencies can also help managers to improve products/services, explore new markets, and frame strategies to achieve greater customer satisfaction (Sahin et. al., 2015); thus, ultimately enhancing self's and firm's performance in general. Also, this fit gives enterprises an edge over close competitors within industries leading to increased personnel and financial performance (Neghabi and Bahadori, 2012).

Limitation and future scope

Though this study highlights the role of an important individual level competence, it also suffers from some limitations. First, although we have used common method bias technique to overcome any discrepancies occurred because of self-reported form of data collection, the study still relied on an individual's self-understanding which may have hindered the process of data collection due to socially desirable responding. The sample size of 204 managers may not be adequate to generalize the results. Future studies may consider larger sample size in order to validate the results of this study further. Also, there lies geographic restrictions, as the study only looks into the Indian context. However, the study provides a strong foundation to practitioners and academics to explore MI while taking a comprehensive view of cognitive, affective and action-oriented within and outside the organization. Also, the study explains the individual differences in pursuing intrapreneurship within organizations by looking into a deep-level trait which has an incremental value over personality and other demographic factors such as age and education. In future studies, 360-degree approach to measure EI could be used to investigate the concept of emotional intelligence. Also, moderators like Perceived

Superior Support (PSS), Perceived Organizational Support (POS) could be used for future studies, based on these present findings. Further studies are also warranted to see whether the results of this study replicate to other organizations (e.g., third sector or manufacturing sector). The dimensions of culture may also be explored to understand the influence of individual level competencies on MI.

Conclusion

Over all one can conclude that a healthy organizational environment, where every individual is respected, treated well, without any discrimination of gender and hierarchy is very important to encourage intrapreneurship. Intrapreneurship is the new competitive advantage (Covin and Miles, 1999) for organizations and helps them sustain the cut-throat competition. Individual competencies play a very important role in MI and also emotional intelligence explains significant variance in MI; thus, indicating towards the role of empathy and emotions to intrapreneurship apart from risk-taking and proactive behavior. However, it was found that self-control played an insignificant role in predicting MI within organization. This was indicative to a more aggressive and competitive state of individual working. Employees today, aggressively pursue their goals and objectives to remain valued in organizations even if it means working under stress. Organizations must pay attention to such deviation as it may results in desired goals in short term but in the long run it may result into organizational burnout; thus, leading to poor performance overall.

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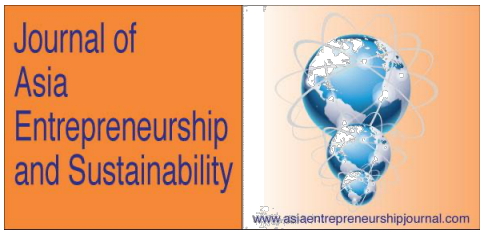

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Mediating Role of Mindfulness Between Vitality at Work and Sustainable Employability among IT & BSFI Employees in India

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ABSTRACT

The study examined the mediation role of mindfulness between vitality at the workplace and sustainable employability. An online questionnaire was used to reach a sample of 232 employees in the IT and BFSI sectors. To test the hypotheses, Pearson correlations and the mediation effect test were used. The findings show that there is a positive relationship between vitality at work and mindfulness, that vitality at work is positively associated with sustainable employment, and that mindfulness is positively associated with sustainable employment. Further, partial mediation of mindfulness is observed between vitality at work and sustainable employability. However, the variance explained is very low. The study is unique in the Indian context, with a focus on

mindfulness short interventions to promote long-term employability through vitality. The study is cross-sectional in nature, and it adds to the body of knowledge on sustainable employability and mindfulness. Practitioners could use mindfulness interventions to promote vitality among employees, allowing them to learn new skills and achieve sustainable employability. Mindfulness interventions in general can improve employees' overall well-being.

INTRODUCTION

Jobs in today's modern society have become trivial and unappealing (Van der Klink 2016). With the changing work dynamics of an ageing workforce, decreased availability of employable workforce (Tossi 2012), and an increased retirement age (Truxillo, Cadiz, and Hammer, 2015), no organisation can provide employees with stable employment opportunities. Because of the nature of change and uncertainty in business needs (Tossi, 2012; Truxillo et al. 2015), all employees must be productive, creative, and innovative (Garland et al. 2010; Ryan et al. 2008) in order to have sustainable employability. To achieve sustainable employability and career goals, one must constantly pursue new skills and competencies; and the organizations must provide distance, modular, and practical learning experience (Hsu, 2010). The key to sustainable employability is to motivate employees to work now and, in the future, (van Harten, Knies, and Leisink 2016; van Vuuren, Caniels, and Semeijn 2011). The key characteristics of sustainable employability are meaningful work, rewards and recognitions, job security, and the value of work. The sustainability has permeated the IT sector including IT education and one of the key concepts that must be thoroughly researched to understand the changing work dynamics is sustainable employability (Pattinson, 2011). Person-organization fit (Sharma, 2019) and employer attractiveness are important factors in retaining and sustaining the employees in the organizations (Saraswathy,

2011). The research on sustainable HRM practices such as sustainable talent acquisition assists organizations in enabling sustainable employability. Organizations that adopt such practices will inevitably focus on the social, economic, and environmental pillars of sustainability (Mohapatra, 2018) and promote sustainable employability; as a result organizations must invest in sustainable employability practices. IBM, GE, and Google among others, have developed and implemented HRM policies, programmes to promote sustainable employability. In general sustainable employability (SE) refers to "employees' capacities to function in work and on the labor market throughout their working lives" (Van der Klink, et al. 2016). Both organizations and employees require sustainable employability because organizations wants to achieve long-term goals and sustain the business whereas employees need to survive in the competitive job market, gain financial security, and protect their health and overall well-being (Bram P.I. Fleuren 2020). As a result, organizations are shifting their business models away form strategic human resource management towards a more sustainable business model (Kramar 2014; Sode R. 2019; Ehnert, et al. 2016). Sustainable employability research is still in nascent stage, but there is evidence of research on related terms such as sustainable work, sustainable employment in the literature (Fleuren , 2020).

Workplace vitality is one of the determinants of sustainable employability (Arjella R. van Scheppingen et al. 2014). A person with high levels of vitality is alert and energized, can deal with stressful situations effectively, has a lot of energy and is in good mental health (Bostic, Rubio, and Hood 2000). Vitality is influenced by the physical, psychological, and social environment (Arjella R. van Scheppingen et al. 2014), and it helps to optimize organizational fucntions and create sustianable employability (Arjella R. van Scheppingen et al. 2014). Mindfulness, a realtively new

positive psychological construct, has been linked to increase energy level through mindfulness practices and interventions (Smith et al. 2008). Mindfulness energizes the individual (Brown and Ryan 2003; Brown, Ryan, and Creswell 2007) and improves clarity and vividness of the present moment (Brown and Ryan, 2003; Brown, Ryan, and Creswell 2007). Vitality research (van Vuuren 2011; Seligman and Csikszentmihalyi 2000; Chambers, Lo and Allen 2008; Carmeli, Ben-Hador, Waldmann, and Rupp 2009) and mindfulness research (Brown and Ryan 2003; Carmody, Reed, Kristeller, and Merriam 2008) are in nascent stage, particularly in work settings (Arjella R. van Scheppingen et al. 2014).

Workplace vitaltity and mindfulness are strong predictors of workplace outcomes such as increased productivity, reduced workplace stress, increased creativity, innovation behavior (Garland et al. 2010; Ryan and Frederick 1997; Ryan, Huta, and Deci 2008) and are strongly related to good health, wellbeing, life and work satisfaction (Fredrickson, 2004; Garland 2007; Garland et al. 2010; Ryan and Frederick 1997; Ryan, Huta, and Deci 2008).

The capability approach (Sen, 1993) that focuses on converting resources into capabilities and then incorporating them into work functions. The approach proposes that individual's capabilities reflect various combinations of functions that a person can achieve, depending on his or her circumstances; the various combinations of what s/he can do. Pphysical, material, or personal resources can be converted into capabilities to achieve the organizational and personal goals (Sen 1993). Workplace vitality and mindfulness are two personal resources that can be converted into capabilities which will help an employee acheive sustainable employability. Based on the literature we propose two aims for the study, the first is to investigate the relationship between workplace

vitality and sustainable employability, and the second aim is to investigate the mediated role of mindfulness between workplace vitality and sustainable employability.

REVIEW LITERATURE

Vitality

Ryan and Frederick (1997, 530) defined vitality as "one's conscious experience of possessing energy and aliveness, "which derives from an internal source and serves as a global indicator of positive health. High subjective vitality has been linked to being alert and energized, effectively cooing with stress, having more energy to perform activities, and better mental health (Bostic, Rubio, and Hood 2000). Subjective vitality is strongly linked with well-being, positive affect and life satisfaction (Demir and Ozdemir 2010; Demir, Ozdemir, and Weitekamp 2007). Workplace vitality is an important predictor of wellbeing and key factor in achieving sustainable employability. People with high vitality are less prone stress, more resilient as evidenced by increased productivity, creative and innovative behavior. Workplace vitality leads to increased attention, productivity and positive outcomes (Demir and Ozdemir 2010). On a broader scale, vitality has two components : physical and psychological. Physical components of vitality are high energy levels, being fit and strong whereas psychological components of vitality are perseverance, resilience, experiencing less fatigue, overall wellbeing. Social network is another important determinant of vitality. Social interactions have both positive and negative effects person's vitality. For example, interaction with some people can reenergize a person while also draining their energy in some cases. Vitality has been studied as a multifactorial construct in the fields of medical science, social science, psychology, and organizational behavior. Vitality research has been studied in variety of context. In medicine, researchers concentrated on physical conditions. It is studied in

social psychology as support function for growth, resilience, and self-actualization. The vitality in organizational context determines interpersonal relationships, performance, and social interactions as team. Vitality is defined as as positive energy and that can be developed for a positive personal and organizational outcome such as sustainable employability (Ryan, 1997). To achieve organizations goals, organizations require resources such as workplace vitality. As previously stated, the research on vitality is fragmented in variety of context, making it difficult to promote at workplace.

Mindfulness

Mindfulness, a Buddhist tradition, has recently piqued the interest of industrial or organizational behavior scholars (Dane 2011; Glomb, Duffy, Bono, and Yang, et al. 2011; Kabat-Zinn 1990). Mindfulness is cognitive process that allows a person to focus on sensory input without analyzing their thoughts. Because it varies form person to person and moment to moment, mindfulness could be a trait level or state level construct. Previous research has found negative relationship between mindfulness and rumination, anxiety, and distress (Dane, 2011). Some studies found ma link between emotional clarity and relationship satisfaction. Mindfulness has positive association with task performance, vitality, and work-family balance from an organizational standpoint (Dane, 2011). Mindfulness has been defined as, "intentionally paying attention to present-moment experience (physical sensations, perceptions, affective states, thoughts, and imagery) in a nonjudgmental manner, thereby cultivating a stable and nonreactive awareness" (Carmody, Reed, Kristeller and Merriam 2008, p.394). Through the practice of mindfulness meditation one can

become flexible and adaptable to changes. Dane and Glomb et al. (2011) provided ample evidences of positive work and introduced mindfulness-based interventions. Mindfulness energizes the individual (Brown and Ryan 2003; Brown, Ryan, and Creswell 2007) and improves clarity and vividness of the present moment (Brown and Ryan 2003; Brown, Ryan, and Creswell 2007). It has linked to increased daily energy level (Smith et al. 2008) and vitality (Brown and Ryan 2003). The present moment mindfulness state allows a person to be alert and attentive to their surrondings as well as practice behaviours that aid in role balancing. Mindful regulation of once behavior energizes a person that is nothing but vitality (Brown and Ryan 2003). Vitality as source of positive energy would aid to achieve sustainable employability, and mindfulness is a step in that direction.

Sustainable Employability

Employability is the ability of a person to gain and maintain employment. Sustainable employment is ability to work and continuing the work for a long run. Most definitions of employability stress the individual aspects of the concept (Hillage 1985). A different approach emerged in 1960s, focusing primarily on the demand side and the accessibility of employment, with employability defined as "the objective expectation, or more or less high probability, that a person looking for a job can have of finding one" (Gazier 1998, 44). Another trend identified by Gazier (1998) emerged in the 1970s focused on measurable labor market outcomes, such as the period of time an individual is employed, hours worked, and wage rates that result from specific policy interventions. Finally, the notion of interactive employability has been put forward whereby employers and policymakers interact with individuals in order to gain and maintain employment

while accepting the importance of individual agency (Gazier 1998). In this last and most recent notion of employability workers and the work environment strive to gain and maintain employment in work that is valuable for the worker and valued by the work context. The recent extension to employability is sustainable employability. According to van der Klink et al. (2016) sustainable employability means that workers enjoy the necessary conditions that allow them to make a valuable contribution to the organization as well as to their own benefit through their work, now and in the future, while safeguarding their health and welfare. Sustainable employability encompasses the ability of employees to work in such a way that they can meet their own needs and labor market requirements in the present, without compromising their ability to meet these in the future (van der Klink et al. 2016; Sanders 2015).'

The Capability Approach

The capability approaches (CA), introduced by Amartya Sen (1993), states that individuals should have the capabilities to conceive, pursue, and revise their life plans through capabilities, functionings and freedom. Functionings represent "the states and activities that constitute a person's being: "beings and doings people have reason to value" The capabilities reflect "the different combination of functionings that person is able to achieve, depending on his/her particular circumstances; the various combinations of what s/he can do or be" and freedom is "the possibility to shape one's life and living environment (process) and, on the other hand, the possibility to achieve valued goals" (Sen, 1993, 40). He equates capabilities with freedoms; capabilities reflect the freedom of individuals to do what they wish to do and to be what they want to be. Capabilities therefore represent a person's opportunity and ability to achieve valuable outcomes, considering relevant personal characteristics and external factors: being able and

enabled. Applied to work, this ensures valuable work outcomes, which in our view is an important aspect of sustainable employability. Based on CA approach we propose that personal characteristics like mindfulness and vitality that will lead to sustainable employability. Capability includes diverse aspects such as personal resources, material resources, and external environment. Mindfulness as state of alertness cultivate a stable and nonreactive awareness of the present moment (Carmody, Reed, Kristeller, and Merriam 2008, 394) and vitality (Bostic, Rubio, and Hood 2000) is about having more energy to perform activities and better mental health, with this two positive personal resources can become capabilities for an individual to sustain the current work that is meaningful and valuable and will able to work in the future (sustainable employability) because mindfulness will help the individual to be aware of the present moment by being nonreactive(Carmody, Reed, Kristeller, and Merriam 2008, 394) and with vitality (Bostic, Rubio, and Hood 2000) he/she can overcome the turbulent changing workforce dynamics. The SE as capabilities combine individual capability of skills and knowledge and Abma, et al. (2016) developed constructs to measure sustainable employability. They argue that skills and knowledge are capabilities to promote sustainable employability and organizations providing specific opportunities to employees can improve sustainable employability such as training and development to learn new skills, knowledge as per the changing market requirement. Research on sustainable employability identifies conditions that will lead an individual to work till their retirement age (van der Klink, 2016; Flueuren, 2015) and considerable literature on older workforce sustainable employability exists in literature (Brouweer, 2012). Sustainable employability among older workforce is hindered due to the age related chronic disorders (Flueuren, 2015). In conclusion capability approach provides antecedents and indicators to capture sustainable employability.

With aforesaid literature review we, propose to test the following hypotheses.

H1: Vitality at work is positively associated with sustainable employability.

H2: Vitality at work is positively associated with mindfulness.

H3. Mindfulness is positively associated with sustainable employability.

H4. Mindfulness mediates the relationship between the vitality at work and sustainable employability.

METHODOLOGY

Measures

Vitality

Vatality measurement was carried out by using 6-item scale developed by Bostic et al. (2000) on a Likert rating range from " not true at all" to "very true" and an item from the scale include " I feel alive and vital". The goodness-of-fit indexes results depicts : $\chi^2 = 18.19$, $df = 9$, RMSEA = 0.06, CFI = 0.95, GFI = 0.97. Item loading ranged from .35 to .79. The internal consistency coefficient of the MAAS was .81 and correlated item –total correlations ranged from 0.31 to .68. Cronbach's alpha reported was 0.79 indicating high reliability. The scale validity was proved by Bostic et al.(2000).

Mindfulness

Mindfulness Attention Awareness Scale (MAAS) (Brown and Ryan 2003), a 15-item measurement scale on 6 point rating from "almost never" to "almost always" was used to measure mindfulness. An item from the scale include "I could be experiencing some emotions and not be conscious of it until sometime later". The score of MAAS is obtained by addition of all the items scores, higher

the score means higher the mindfulness. The goodness-of-fit indexes were as follows: $\chi^2 = 88.1$, *df* = 25, RMSEA = 0.07, CFI = 0.90, GFI = 0.92. Item loading ranged from .35 to .79. The internal consistency coefficient of the MAAS was .81 and correlated item –total correlations ranged from 0.31 to .68.

Sustainable employability

Sustainable employability was assessed by one item scale (Arjella R. van Scheppingen, 2015) and the item include "Taken into consideration of your healt, do you expect you will be able to continue to do same work in the same organiztion ". The response was taken on 1 being No, I will definitely not be able to work for another 5-10 years, 2 being maybe, 3 being yes, centainly I will be conituing to do same work for another 5-10 years in the same organization. The scale is highly reliable with a Cronbach's alpha of 0.71 and it is highly validated by Arjella R. van Scheppingen (2015).

Sample

The employees from service sector compromising IT & BFSI were target through online questionnaire. The services sectors were targeted as they are major employment providers in India. Total of 232 filled in responses were retrieved. The sample characteristics are depicted in Table 1.

Table 1 Sample characteristics (N=232)

Characteristics	Category	Frequency
Gender	Male	62%
	Female	48%
Age	16-25	23%
	26-35	40%
	36-45	30%
	>46	7%
Experience	1-5	38%
	6-10	37%
	>10	25%

RESULTS

Means, standard deviations, and correlations are depicted in Table 2. Vitality at work and trait mindfulness relationship is positively associated (r = .04); similarly vitality is positively associated with sustainable employability (r = .71); and also trait mindfulness is strongly and positively associated with sustainable employment (r = .60), hence hypotheses 1, 2, & 3 are proved. The correlation between independent variables is not significant; therefore the problem of multi-collinearity does not exists and allow to go for regression analysis.

Mediation was tested by using procedure proposed by Barron and Kenny (1986). The trait mindfulness was predicted positively (β = 0.40, t = 3.10, *p* <0.003) by vitality at work (R^2= .25, 95% CI = .09, .19). Sustainable employability was predicted positively (β = 0.64, t = 3.98, *p* <0.000) by trait mindfulness (R^2= .33, 95% CI = .89, 1.00).

Third step mediation was carried out. The results indicated that sustainable employability was predicted positively (β = 0.41, t = 3.95, *p* <0.003) by vitality at work (R^2= .25, 95% CI = .11, .37). Later mindfulness and vitality of work were entered together, the dual relationship between vitality at work and sustainable employability β = 0.31, t = 2.15, *p* <0.000) decreased (R^2= .19, 95% CI = .09, .29) but the relationship is still significant.

The results indicate a partial mediation effect; therefore it is said that trait mindfulness partially mediates the relationship between vitality at work and sustainable employability. However, the variance explained is very low from .31 to .41 as depicted in the Figure1. The model verified Sobel Z test, with Z = 7.92 (*p* <.000) to verify that results are not result from collinearity issues.

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Tabel 2 Mean, Standard deviation, and Correlations

	1	2	3
1. Vitality at work	-		
2. Trait mindfulness	.04*	-	
3. Sustainable employability	.71**	.60**	-
Mean	4.09	4.07	3.87
Standard deviation	.49	.54	0.65

***correlation is significant at the 0.01 level,* correlation is significant at the 0.05 level*

DISCUSSIONS

Sustainable employability is need of the hour for any organization. Changing workforce dynamics ((Tossi 2012 ; Truxillo et al. 2015) in globalized world it is important for an individual to be productive, creative and innovative (Garland et al. 2010; Ryan et al. 2008) so that he/she is able to adapt to change environment and sustain their employment. Sustainable employability is ability of an employees to work in such a way that they are able to meet their own needs and labor market requirements in the present, without compromising their ability to meet these in the future (van der Klink et al. 2016; Sanders 2015). Based on capability approach (Sen 1993) we tested personal characteristics such as mindfulness and vitality could help an individual towards sustainable

employability. Mindfulness as state of alertness cultivates a stable and nonreactive awareness of the present moment (Carmody, Reed, Kristeller, and Merriam 2008, 394) and vitality (Bostic, Rubio, and Hood 2000) is about having more energy to perform activities and better mental health. These two positive personal resources could be developed as capabilities for an individual to sustain the current work that is meaningful, valuable, and will make him able to work in the future (sustainable employability) because mindfulness will help the individual to be aware of the present moment by being nonreactive (Carmody, Reed, Kristeller, and Merriam 2008, 394) and with vitality (Bostic, Rubio, and Hood 2000) he/she can overcome the turbulent changing workforce dynamics. The results indicate positive association between vitality at work with trait mindfulness and sustainable employability; also trait mindfulness is strongly and positively associated with sustainable employment. Further, the results indicate a partial mediation effect of trait mindfulness between vitality at work and sustainable employability. However, the variance explained is very low. The study contributes to literature on sustainable employability and that of mindfulness. Future studies could explore longitudinal sample in different sectors and context.

Figure 1: Standardized β coefficient for the relationship between vitality at work and sustainable employability and mindfulness as a mediator.

LIMITATIONS

The study is cross sectional in nature and could be extended to longitudinal to get more insights on sustainable employability by investigating in different context and sectors could be a way forward. The study considered mindfulness as a state construct and could be considered to measure it as trait construct. The mindfulness interventions could also be used to see the casual relationship before and after experiencing mindfulness practice.

CONCLUSION

The study proves that vitality at work and trait mindfulness predicts sustainable employability and further, trait mindfulness mediate the relationship between vitality at work and sustainable

employability. Organizations can reap the benefits of mindfulness to achieve the sustainable employability and at the same time vitality at work will help to achieve the organizational outcomes like increased performance, satisfaction, and overall well-being of the employees and organization.

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Adapting New Technology to Business: Impact for Customer Experience and Customer Journey

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Abstract

Customer experience has been emphasized to be significant aspect in business transaction. Research in this topic has been widely executed from different and ranging results has been documented. As business adopt new technology, it has altered how customer experience work.

When customer encounter new transaction method, their experience also shifted. Only few studies exposing how both have impacted each other. This paper provides a framework for assessing customer experience in the use of new technology particularly AI based services. It explains how businesses can improve customer experience by integrating modern technology. By such framework, managers can identify and develop strategies which is based on customer experience to lead the market competition. The paper contributes to the literature by providing analysis and assessment on customer experience related to current business environment.

Moreover, it also offers to extend the study in order to enrich the customer experience literature.

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Introduction

Disruption of new technologies into businesses has shifted the way traditional management has been done for decades. Using advanced technology, business transactions may be completed in a timely and effective manner. Customers and manufacturers benefit from increased convenience in business. For customers, their experiences with business transactions may influence their urge to continue purchasing from a certain firm in the future. Customer experience has been significantly impacted in some respects, if not entirely, as a result of such technological progress.

Businesses have placed a high value on customer experience because it has the potential to promote both performance and profitability. Various strategies have been implemented fromtime to time to improve customer experience and customer journey. According to reports, firms with strong customer experience have grown their revenue faster than those firms that do not focus on customer experience. Those with superior customer experience have garnered more brand preferences (Harvard Business Review Analytic Services, 2014; Forrester Report, 2018).

Customers may have different experiences while using new technology than they did previously. Customers have had some novel purchasing experiences as a result of innovation in the shopping experience. Augmented reality, for example, allows users to enjoy an improved real-world experience combined with virtual stimuli. Siri, as a virtual assistant, also assists users in reducingthe amount of time they spend searching for information on their device. Customers may now obtain product information from a chatbot without having to wait. These new technologies will continue to revolutionize the customer experience. Verhoef et al. (2009) emphasized the relevance of technology in the customer buying experience, particularly the technology-based delivery system.

Since the early 2000s, customer experience research has grown at a rapid pace. There are, however, few studies that combine consumer experience with modern business technologies. New technology will impact how customers search for product and brand, how they evaluate alternatives, make decisions, as well as the way they consume products and brands, all of which will enhance the customer relationship management process (Libai et al., 2020) Furthermore, developing technologies will deliver added value to customers (Rangaswamy et al., 2020).

The paper aims to provide a framework of customer experience which is impacted by the use of new technology. It portrays how businesses can improve customer experience by integrating modern technology. Furthermore, managers can identify and develop strategies which is basedon customer experience to lead the market competition. The paper contributes to the literature byproviding analysis and assessment on customer experience related to current business environment. Moreover, it also offers to extend the study in order to enrich the customerexperience literature.

We focused on the development of customer experience in the context of Business to consumer (B2C) business. The new technologies refer to three categories which are internet of things, AR/VR and virtual assistant/chatbots. We discuss how these technologies has a role in the customer journey and impact to the customer experience.

Literature Review Customer Experience

A concept of customer experience has been growing since Schmitt (1999) firstly introduced the study of customer experience by emphasizing this idea as responses of customers of theirtransaction journey in a particular business. The definition later developed by scholars ranging from different types of industry they studied. However, the term “experience” does not have absolute definition as it depends on many factors that managers cannot control such as personal preferences and characteristics

of customers. As it comprises different definitions, perspectives, and factors (Klaus & Maklan, 2012; Walls, Okumus, Wang, Joon, & Walls, 2011), Klaus & Maklan (2013) provided a scale to measure customer experience using EXQ which consist of product experience, outcome focus, moments-of-truth and peace-of-mind.

Schmitt (1999) argued that there are five components of customer experience including cognitive, sensory, affective, physical, and social identity. Meanwhile, Gentile, Spiller, & Noci (2007) mentioned six components in CX which are sensorial, emotional, cognitive, pragmatic, lifestyle, and relational. The customer experience components are vary based on several existing theories because there are different assessment used. Customer experience is a concept that integrates dimensions including cognitive, physical/sensory, emotional, and social (Keiningham et al., 2017).

Cognitive dimension of customer experience is based on the assumption that customers' behavior is goal directed (Bagozzi and Dholakia, 1999) as they have expectation prior to choosing product and service (Baumgartner and Pieters, 2008; Gentil et al., 2007; Homburg etal., 2006). This can be measured by examining goal achievement as well as assessing the impact of consumption.

Physical and sensorial dimension is described as how customers experience the transaction journey through features and environments that the business offered. Customers encounter condition, design, functionality, and accessibility of a business and assess them as a part of shopping experience (Bitner, 1992). As technology advances, this dimension also shifts according to the environment of the business.

Emotional element of customer experience emphasizes response upon any interaction with customers. Studies find variety of approaches to the content and organization of emotions. Key research has focused on specific emotions such as joy and surprise, wrath, fury, irritation,frustration, aggravation (McColl Kennedy et al., 2003), and regret and its relation to consumer outcomes such as enjoyment, satisfaction, disgust, and indignation (Parasuraman et al., 2016; Bougie, Pieters and Zeelenberg, 2003).

Social dimension refers to interaction between customers and social values in the society including the influence of other people as well as wider social network before, during and after the transaction (Verhoef et al., 2009). It is necessary to apprehend social element as a significant determinant in measuring customer experience even though it is a complex aspect to be measured.

Customer Journey

According to Verhoef et al. (2009), customers go through a journey which is divided into three phases: prepurchase, purchase, and postpurchase. In each phase, customers interact with various elements of the firm. There are many touchpoints that customers have to get through from the early information about the firm's identity (name, design and logo, and other visual elements) and product (packaging, formulation, quantity and quality) as well as service provided by the firm. Prepurchase stage comprises a journey from customer's need or goal recognition, attention to satisfy the goal, to the consideration to purchase product to fulfil the goal (Hoyer 1984; Pieters, Baumgartner, and Allen 1995). This involves all elements of interaction of brand, environment, and category with customer prior to making a purchase.

Thereafter, the purchase stage encompasses all interaction between customers and the brand (firm) during the purchase transaction process mainly the customer's product selection, ordering process and payment. Even though this stage has been generally compressed, there are considerable amount of research show that this process is much influenced by marketing activities (Kotler & Keller, 2015) and service environment that could influence purchase decision (Bitner, 1990).

Finally, customers enter the post purchase stage that involves customer's use of product, brand's service, and any interaction following a purchase. Research on this topic focus on the product and the post purchase service such as consumption experience, repurchase, service recovery, and feedback (Court et al., 2009) as well as customer engagement form of word of mouth (van Doornet al., 2010) which is all related to customer loyalty.

New technologies in shopping experience

In service, AI development has enabled traditional tasks to be automated (Huang & Rust, 2018) and simplify service to be more convenient and effective for customers. The digital revolution has entered a new phase where all information can turn into products (Schmitt, 2019). In this transition phase, Hoyer et al. (2020) clustered the new technologies into three which are Internet of Things (IoT), Augmented reality, and virtual assistant or chatbot. Hoyer et al. (2020) also argued that such technologies will transform customer experience into a new concept of how customer start to perceive and experience product as well as how customers relate to each other.

Internet of Things (IoT) is described as a system which embed sensors, softwares, and other technologies to connect to internet in a real time. IoT has the capability to create interconnection amongst

devices which is very substantial for services in almost every industry sector including retails, healthcare, public service, and city development. Yet, this technology also raised several challenges in terms of privacy issues. Ziegeldorf et al (2014) pointed out that several issues such as the identification of features that users are not familiar with, tracking of users' location, user profiling, publishing private information od users, and information linkage that is unintended by users the threats of IoT that could harm privacy of customers. To date, it is important to business to gain benefits of IoT but also to prioritize customers' privacy which might be a challenge to the business.

Customers can also get a unique experience with augmented reality and virtual reality since they provide a real-life display and interaction. They offer significant value to the consumer journey by providing a more engaging and richer experience. AR connects virtual scenes to the actual

world, whereas VR allows users to immerse themselves in a completely virtual environment, completely bypassing the real world (Huang & Liao, 2015).

Virtual assistant plays a significant role in today's shopping experience. Basically, virtual assistant is powered by AI which can perform cognitive tasks such as learning and decision- making, enabling the program to identify user queries and to perform tasks requested by user. Algorithms are used by AI to allow machines to understand and produce natural language, make the machines learn from experience, as well as reflect emotions to users. Nowadays, they are built to outperform comprehensive human tasks specifically, from diagnosing some complex diseases, automating cars to providing legal advice (Simonite, 2014). Algorithms can also identify emotion in facial expressions and tone of voice, which appear to be subjective human tasks. (Kodra, Senechal, McDuff, & El Kaliouby, 2013).

IoT and AI based service is already reshaping marketing in many spaces, including retailing (Shankar, 2018). Because of technological advancements, innovation is being generated at a quicker rate, and firm performance is improving. There is a need to evaluate how these technologies affect the consumer experience.

Method

The research starts with the literature review, continues with identifying the literature gaps on defining and examining impact of technology to customer experience through customer's journey point of view and ends with a proposed conceptual framework.

This paper incorporates the influence of new technology into Keiningham et al. (2017)'s concept of consumer experience (cognitive, physical/sensory, emotional, and social). By analyzing the influence of new technologies on customer experience aspects, it is possible to determine if the customer experience is reinforced or improved. The following framework is assessing customer experience dimensions while adopting new technologies in customer's journey.

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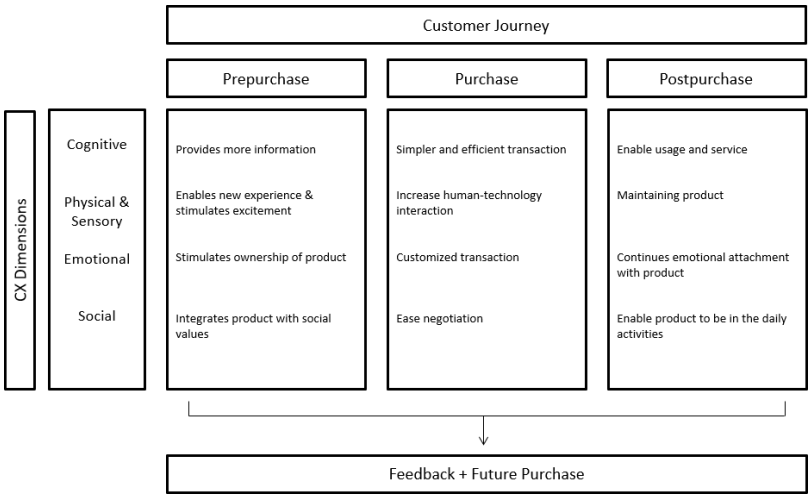

Figure 1. Framework of impact of new technology adoption to customer experience. (Author's representation)

Result and Discussion

1. Prepurchase stage

The prepurchase stage becomes the first yet the important phase for brands to engage with customers (Lemon & Verhoef, 2016). While it requires many aspects of product knowledge, marketing strategy and image for the brand, there are plenty of technologies used at this stage. For example, RFID and barcode scanning used to give customers more information access. AR and VR devices to help customers test and experience the product before they purchase, and chatbots are used to direct customers to any preferred products without having to wait. The new technologies can help to increase customer experience in this stage with those dimensions.

For the cognitive dimension, the use of IoT allows customers to gain more information to the products. For example, RFID technology has been widely used by businesses to give customers any available and customized information that they wanted in seconds. Such information such as discounts and launches could also be sent to customers according to their preference of product (Shankar et al., 2016). This indicates to affect customers' cognitive dimension.

By more information access, customers are stimulated with these new experiences, and this enables physical and sensory dimension to be increased as well. Accordingly, customers encounter easier information collection. Customers find new experiences and sense enjoyment of such process. Digital services play vital role in this dimension by offering customized information so that customers respond immediately. As an example, in the hospitality industry, restaurants are offering robot service and virtual menu to enable new physical experiences for customers as well as increasing effectiveness and reducing uncertainty in customers. Moreover, such technologies also used in retail industry to visualize the information to the customers. Furniture brands using VR to allow customers design and furnish and fit their places with the products according to customers' preference.

At the emotional dimension, customers can obtain an attachment to the product offered by experiencing technologies such as AR. As when customers try out to see the product in visual blended with reality, customers will start to be emotionally stimulated to own the product. As they try the products, it increases the level of excitement and curiosity to the products (Scholz & Duffy, 2018).

Finally, social dimension wraps all the experiences, and the technology plays to integrate the product with the value of customers. It also allows customers to embed the products with their lives even before they purchase the product. Firms need to aim for increasing the value of reality type through prudent device and software development. This plays important role as customers will make decision whether to move on to the purchase stage.

2. Purchase stage

The purchase stage begins to play when customers reach a decision. IoT, VR/AR, and virtual assistants have shifted the traditional transaction procedure. Automation is a significant element of today's modern businesses since it provides customers with a high level of convenience, less time spent and greater efficiency.

Here, the cognitive dimension is really equipped. It helps cognitive function to work based on the given information by the AI based services. Travel apps such as Uber, Lyft, and Grab offer AI based feature when customers are going to make ride or delivery booking. It serves to issue price based on real-time data considering location and traffic as well as time which result in supply-and-demand-based, and therefore transparent pricing for their transaction. The feature allows customers to make booking and transaction easier and help to make decision faster.

Also, those technologies impact the physical and sensory dimension as customers undergo unique purchase experience. As automation helps the transaction process, customers experience new physical impression, increasing the interaction between human and technology (Park, MacInnis, Priester, Eisingerich, & Iacobucci, 2010). Some of the examples in the retail business as cashier is

now automated, customers can do the cashier's activities including scanning the goods and payment process by themselves, indicating interaction between customers and the element of the firm. Another example is restaurants offering augmented storytelling in dining experience with particular theme or season. Customers' emotional dimensions are stimulated when they find their transaction is personalized and their demands are satisfied. The key to improving the emotional dimension of the customer experience is satisfaction with the purchasing process (De Keyser, Verleye, Lemon, Keiningham, & Klaus, 2020). When customers encounter simple, customized, and efficient order placing and payment, they feel satisfied about the project and accordingly result in strong customer experience.

Because of the simplicity of negotiating and transaction, such advanced transactions will result in an enhanced social dimension. Customers' social value will be embedded in the new mode of transaction since they will be exposed to it on a frequent basis. The use of QR codes as a payment method has altered social value, resulting in a new societal behavior and increased convenience.

3. Postpurchase stage

The postpurchase stage does not limited to the feedback and services by the brand. It also includes the process of enabling the products or services to be utilized by customers as well as other interactions that might be needed. IoT, AR/VR and virtual assistant also impacts customer experience at this stage.

At the cognitive dimension, they act to enable service and maintaining products to be utilized by customers. AI based services are capable of detecting any issue and trouble after purchase

transaction as well as assisting customers on how to utilize products. Digital business platforms usually excel this stage by providing customers with providing alerts and recommendations after purchase, enabling customers to use the product at the most, give feedback or make another purchase of the products (Rangaswamy et al., 2020).

They also continue to attach the products to the customer in which it is a part of physical and sensory dimension. As customers own the products, they feel more attachment and interconnection with the products which is in line with firms' marketing objective. In terms of usage and consumption, IoT and AI based service acts to maintain product purchase and customer retention. Because of the assembly system, it will be difficult for a customer to give up a product or gadget without modifying other devices.

As sensory has been enhanced, emotional dimension also blends with it. The more customers are attached with the products, brand engagement will also be enhanced (Brakus, Schmitt, & Zarantonello, 2009). Virtual assistant and chatbots, for example, creates emotional attachment to the customers, making it as human companion. Those services act to make intelligence tangible and result in customers' emotions.

The last impact of those technologies is the social dimension that allow product to be part of customers' daily activities. Interaction between human and technology becomes evident and Accepted. Human and technology shall be integrated into delivering social value so that the interaction barrier can be eliminated.

At the end of the framework, those customer experiences lead to feedback and future purchase decision. As those technologies help to enhance customer experience, firms also need to integrate the technology to their business model and utilize them as good as possible. In this stage, it is the firm's responsibility to set the strategy to maintain customers loyalty.

Conclusion

The study of customer experience has been thoroughly investigated. The availability of new technologies to assist corporate processes has had an impact on the research of customer experience. This study has provided a framework for managers and researchers to better understand customer experience in a changing technological environment. Based on the discussion, these new technologies play critical roles in the consumer journey, encompassing the prepurchase, purchase, and post-purchase stages.

However, firm still has to build strategy on how to integrate technology, maintain customer loyalty, and booster innovation. Although technology provides customers with new, easier, and more effective experiences, it must be linked with the business model in order to create a unified transaction as well as a great business experience. Following that, it is the firm's difficult duty to maintain customer loyalty so that customers are ready to engage and repeat purchases. Firms must also increase innovation by assessing technological integration as well as customer experience-based assessment in order to encourage growth and sustainability.

This study contributes to the literature by extending the customer experience concept through leveraging new technologies in the business which has impacted the journey of customers. This

study also has practical implication which is enabling businesses to occupy new technology to their business and achieving maximum customer experience. For managers, it helps to evaluate and redesign their business according to the framework in order to excel their business and maintain customer loyalty. Managers can imply new technologies in an effective way based on their needs and how they want customers to experience.

As a conceptual paper, it has inevitable limitations, a need for empirical examination as well as an opportunity for theorizing in the future. The result of this paper calls for a need to comprehensively assess those technologies deeply, to what extent it impacts the cx dimension positively or negatively. By having such measurement, we can utilize them according to its maximum positive impact so that it results in best customer experience.

Also, as Keiningham et al. (2020) stated that business model innovation is correlated with cx, future research can examine how these new technologies could affect business model innovation. It involves the process of reinventing value proposition or the operating model (Lindgardt et al., 2009). it is clear to say that business model innovation relates with customer experience since customer's assessment plays important role in the effort of improving and developing the value of products and services.

However, as these new technologies are providing so many information, there is a tendency to customer would overload with these. It is necessary to study on how much information is sufficient enough for customer to get. By having such measurement, business can act and innovate based on their needs.

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Critical Success Factors for Biotech Incubators - A Qualitative Study of Successful Incubators in China and the US

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Abstract

With the creation of start-up biotech businesses being a very risky pursuit, with capital intensive projects, long product development lead times and regulatory hurdles to overcome, support for such businesses is essential. Business incubators have long been a method of improving start-up success and boosting the local economy. There are, however, many models and metrics for success and some suggestions that in some cases incubators simply keep alive companies that would otherwise not survive. Qualitative interviews were carried out with incubator managers, tenants and partners in the US and China to establish what could be improved in the incubation process, leading to several suggestions for improvements. We found that partnerships with corporate service providers are an underused resource which could provide both revenue for the incubators, network/services for the tenants and boost the local economy with collaborations with tenants

enhancing knowledge transfer. Whilst some incubators gained tenants from other incubators or those who had been validated by gaining significant competitive funding, some early-stage incubators had little in the way of selection criteria past being in the local area or being affiliated with the university. We suggest it might also be useful to provide a filtered pipeline or funnel to the physical incubator using a virtual incubator first to allow a coherent team and strategy to be formed before a commitment to paying for physical space, which could increase the quality of tenants and help founders transition from a pure science base to include business skills.

Introduction

Many initiatives exist to support early-stage biotech companies, including accelerators and incubators, as it is recognised that due to the nature of research these businesses are high risk and the failure rate is high. Incubators have been an integral part of start-up support for several decades with the first business incubators dating back to the 1960s and 1970s as a US Government method of boosting underperforming local economies (Adkins 2001). Universities also began to use incubators to support their own start-ups to take advantage of the Bayh Dole act of 1985 to commercialise their research (Hackett and Dilts, 2004). There are several different types of business model, including not for profit, and they vary in what they offer tenants from simply real estate to an extensive network of support and funding. They also very in the metrics used to judge their success.

Following a major study of incubators in the US (Temali and Campbell 1984), Allen and Rahman (1985) suggest that the main function of an incubator is to increase the chance of a start-up surviving its formative years, however there is some debate on the effectiveness of the incubation

process and at worst, incubators may just be putting off the inevitable, keeping alive companies that have no economic basis for survival once on a level playing field (Amezcua et al., 2013). This could be in part due to conflicting priorities with some incubators- a pressing need to find tenants may mean that selection criteria are relaxed resulting in low quality tenants and a higher failure rate. Much data however suggests that incubators do play a positive role for technology businesses (Mian et al., 2016; Dee et al., 2011) and screening criteria to improve success rates for tenants are discussed by Lumpkin and Ireland (1988).

Hackett and Dilts (2004) suggest that a business incubator is a shared office space facility that seeks to provide its tenants with a strategic, value-adding intervention system of monitoring and business assistance. However, definitions of incubation and incubators are often interchangeable and can include incubators, accelerators, research parks and science parks as well as virtual options. In practice, we consider incubators to be a space (or virtual space) offered at below market prices where a start-up can forward their project with varying levels of support – from simply real estate space to mentoring, networking with potential customers, collaborators and suppliers, access to capital and centralised services such as marketing and accountancy. For life sciences, this can mean a testing ground where a feasible business plan can be built alongside wet work, where the founder can focus on core competencies such as the science without the need for dealing with operations management (such as utilities and IT infrastructure). An accelerator we consider to have a shorter and more clearly defined timescale of occupancy (often 3-6 months), with often a structured programme of activities, less emphasis on personal real estate space and often with an opportunity to pitch for funding at a demo day at the end (Such as Silicon Valley's Y-Combinator). Whilst accelerators do exist for biotech projects, they do not necessarily lend

themselves well to biotech since the long product development lead time, lab facilities required and regulatory hurdles to be overcome cannot be well accommodated in such a short time.

The National Business Incubation Association (NBIA) has more than 1,900 members in 60 nations with approximately 1,400 in the USA (NBIA Data). However, the true number could be 10,000 or more worldwide, with 205 incubators and 163 accelerators in the UK alone in 2017 according to Bone et al., (2017) for example. In the life science sector, more than 1200 incubators have been identified worldwide with over 500 in the United States. The main drivers being big pharma trying to slim the cost base by outsourcing part of the product development process, and by smaller players and start-ups in search of an area where to develop. Life science incubators are becoming a critical part of the ecosystem, filling the gap for young companies and a good source of new high-quality jobs. Incubators are especially useful for life sciences with the amount of funding required, founders often being from a purely technical rather than business background (so in need for support) and with the sharing of expensive lab facilities helpful. The biotech industry often exists in hubs, which emphasises the importance of a supportive ecosystem required for success. There is a higher density of bio-incubators in areas where research centres and universities are present and the more popular locations are higher in demand (so have a high occupancy and limited vacancies) but are therefore also more expensive, and this can be an issue for smaller players with limited financial resources.

Bruneel, et al. (2012) suggest three stages in the evolution of incubators since the first incubator was founded in New York in 1959. Initially, incubators were mostly focused on providing basic facilities and services, such as affordable workspaces and shared resources (such as admin) which

allowed start-ups access to facilities and services otherwise not affordable at the early stage of their development, enabling a focus on their core activities. In the second stage, the incubators focused more on accelerating the learning curve of the small companies, supplying complementary skills to the tenants such as management and business skills. The third generation is characterised by a focus on the network facilitation and the access to resources external to the incubator such as suppliers, customers, potential partners and investors. The access to external networks such as funders is seen as an essential factor in the incubators' success and a significant enabler for the fast development of the tenants. Smilor and Gill (1986) suggested the most important factors were availability of business expertise, access to finance, in-kind financial support, community support, access to entrepreneurial networks, educational programmes, perception of success, robust selection process for tenants, ties with a university and a well-defined programme with clear policies, procedures and milestones. These have been further refined and are summarised by Theodorakopoulos et al. (2014). Shih and Aaboen (2019) analysed the importance of the networks developed within the incubators and with external entities, and how these are important to improve the viability of the incubator business itself. Others have discussed the need for networks for successful start-ups in relation to finance (Jia and Phillips, 2014; Shamenov and Phillips, 2013).

Several authors have attempted to categorise incubators. Allen and McCluskey (1991) suggested 4 types of incubator – (1) Real estate, where selling services, rental income and appreciation of the real estate is the primary motive, (2) Corporate, where job creation and a statement of entrepreneurial intent are the aim (3) Academic incubators that commercialise academic research and collaborate with industry and (4) Seed capital incubators which aim to capitalise on their equity investments in start-ups. This has been added to with the virtual incubator, which focuses

solely on providing services, such as mentoring and access to investors, without physical space or infrastructure and has evolved from the software industry (Nowak and Grantham, 2000). An alternative was suggested by Lewis (2011) that organised incubators into four categories: (1) With walls, the most common set up with multiple tenants, facilities, real estate and management team. (2) Without walls (virtual), where the incubator has a more economic development function for in development or rural areas where customers are geographically distributed and a physical location would have a less relevant impact. They can be more cost-effective but have a weak capability to enhance networking due to the lack of physical presence of peers and experts in the same location. (3) International, which often have groups of people working together but spread in different locations within the same or several countries, and (4) Accelerators which have some overlap with incubators (Bone, et al., 2017), however, the accelerator has more a time-bounded program whose target is to accelerate the start-up growth, typically after graduation from an incubator.

Virtual incubators and accelerators are increasing in number and relevance internationally. The virtual programs are more defined in time (3-6 months), as well as being able to service more clients not being limited to physical space. Kohler (2016) described the significance of the accelerators within corporates and the main characteristics and how to design them. Corporates can utilise the accelerators for improving their innovation capability, refresh the corporate culture, developing new products and accessing new markets, whilst start-ups can access resources and experience from the corporate world, access to market and distribution with corporate credibility and getting access to funding. The corporate can adopt different approaches to the financing, sometimes taking equity stakes the accelerated start-ups. According to Hannon (2004), accelerators are the stage of the highest intensity of business incubation, and they tend to serve more

established and high-growth companies. Also, Grimaldi & Grandi (2005), recognize term accelerator but refer it to as an independent private incubator, which usually does not take part in helping ventures at the business concept phase, but helps companies after launch on specific needs, helping the new ventures to reach a higher level of growth.

Grimaldi and Grandi (2005) identified four different types of incubators, (1) Business Innovation Centres, (2) University Business Incubators, (3) Independent Private Incubators, and (4) Corporate Private Incubators as well as two business models for them, non-profit and for-profit incubators (Al-Mubaraki & Busler, 2010). The majority of incubators, at least in the USA, are of a non-profit type. Non-Profit can apply to stand-alone incubators; those part of a larger entity or program or incubators that work in close relation with other entities, such as universities or companies of different sizes and industries. The non-profit organisations have specific targets and are usually working to achieve a mission, such as development of specific areas, the resolution of particular problems (e.g., Diseases) or have more a social function. Non-Profit incubators are economically supported through donations, public or private funding and/or charging small fees for the use of equipment and facilities. Not having a profit target, they can be financially friendlier to start-ups working within the field of interest for the incubator. The non-profit set up would be more subject to public scrutiny and social pressure to achieve good value for money. For profit target return on investment and stable revenue streams. These are typically achieved in three different ways. The first, and more common method, is to have a return on investment from the rental and the associated service fees that are provided in the incubator. The incomes need to be sufficiently high to give profit to the incubator but at the same time attractive for the tenants that are usually short of financial resources. The second group sees incubated companies as an investment portfolio where

the incubator gets a share of the start-up equity, and the profit will come from the future success and economic development of the tenants. The third is connected with the corporates that look for technology and product development via in-house incubators. The incubators provide means and equipment to promising start-ups developing new solutions within the corporate interests, common in the medical and pharmaceutical fields. There are also cases in which the incubator operates in a hybrid fashion. Entrepreneurs select an incubator based on several factors; stage of venture (incubators are generally better for early stage, whilst accelerators are for more advanced projects), the fit with incubators sector, mission and purpose (both short and long term), selection and graduation policies, services provided and the network of expertise available to connect with (Isabelle, 2013).

Success factors from the incubators can be from rental income (real estate), to successful projects/graduating start-ups, jobs growth (especially if non-profit or government funded) to building the University brand (if a university incubator) and an increasing support to a new breed of graduate entrepreneurs (Phillips 2019; Phillips, 2018; Phillips, 2010). Lewis et al (2011) suggest the most important success factors are creating jobs, fostering an entrepreneurial climate, diversifying the local economy and attracting new companies – and this is often better achieved with a non-profit model, and the size of incubator or age of programme is not necessarily an indicator/predictor of tenant success. Lewis (2011) also suggests that incubator success is helped by having strict entry and exit polices, as well as the support level provided, including a qualified advisory board. They also suggest that on average, nearly 60% of an incubator's budget is from client rent and service fees. Therefore, some level of public sector investment contributes to greater incubator outcomes in terms of job creation and graduation rates and is clearly important to

success. The metrics for success for incubators often depend on the type of incubator and its source of funding. Factors have included occupancy rate/number of occupants (Allen and Rahman 1985), successfully graduating companies, survival rates of incubated companies (Allen and McCluskey, 1991; Hackett and Dilts 2004), jobs created (Allen and McCluskey, 1991) and funding won (Allen 1985). Singaram and Jain (2017) also suggest number of companies processed by the incubator, number of successful exits, employment generation, infrastructure, network and engagement, funding raised, sustainability of the incubator and profitability of incubator.

The value proposition provided by the incubators can be divided into two different categories, resources services and project services. Resources services include human resources, intellectual property strategy planning, capital, networking, space and equipment, whereas project services consist of business planning, executive strategy and institutionalisation. (Lai and Lin, 2015). Modern incubators do not necessarily need to provide services and infrastructure, simpler institutes have still their function for basic research and very early-stage concept developments for individual or small companies. Bruneel, et al. (2012) show that the business incubator tenants have very high utilisation of the "infrastructure" and the "business support" offers, and a slightly lower but still very high (above 70%) utilisation of the "access to the networks".

The survival and success of the incubator and clients are interlinked (Mitra, 2013), with similar challenges such as lack of management skills, limited access to funding, infrastructure and technology required and lack of experienced mentors and lack of variety of entrepreneurs.

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The aim of this research was to qualitatively analyse incubators, identifying some of the subtleties of incubation for biotech start-ups which might be missed by quantitative data due to the amorphous nature of incubation facilities, and whether improvements could be made to the process. Lewis et al (2011) suggest that there is no one best fit model or "magic formula" and there are a several factors including the industry, synergy between companies, local and national polices and the matching of facilities to the needs of the start-ups which all play a role. Analysing a range of incubators by interviewing incubator managers and tenants in the USA and China, we suggest some recommendations and suggestions for good practice.

Method

Since the subject is complex, with many incubators offering something different and each founder/potential tenant ideally wanting a bespoke service, a qualitative study was undertaken. One-to-one interviews usually provide insight into people's perception, understandings and experience of a given subject and the semi-structured approached allowed exploration of spontaneous issues raised by the interviewee during the conversation. In addition to this, the interviews allowed a test of the findings from the literature review and confirm their validity (deductive style of reasoning). Virtual semi-structured interviews were conducted. 12 interviews were scheduled including 7 incubator managers, directors or founders (The Supply Side), 4 existing and potential tenants (Demand Side) and a potential partner (for a more external view). These are detailed in tables 1-3.

Table 1: The Supply side – Incubators general details

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Incubator	**Location/ date founded**	**Profit/Non-profit model**	**Type**	**Target Customer**	**Revenue**	**Access to Networks**	**Access to capital**
A	US (1993)	Non - Profit	Private	Early Stage	Not stated	Yes	Yes
B	China (2019)	Profit	Private	All	Rental, Services	Yes	Yes
C	US (2014)	Non-Profit	Private	Start-ups	80% Partnership, Memberships	Yes	Yes
D	US (1984)	Non-Profit	University	All	Leasing, Investi	No	No

			Affiliated		ng in start-ups		
E	China (2017)	Profit	Corporate Owned	Established	Government, services, Investment	Yes	Yes
F	US (2014)	Profit	Private	All	Rental, Donation, Sponsorship	No	No
G	US (2020)	Non-Profit	University Affiliated	Early, but university affiliated	Government, Sponsorship, Foundation grants, Rental	TBD	TBD

					, Equity , University		

Table 2: The Supply Side – The Incubators target market

Incubator	**Current Tenants**	**Selection Criteria**	**Sector**	**Partnerships**	**Advertising**
A	Early-stage start-ups	Basic	Agri, Food, Sustainability, Cleantech, Life science	Government agencies, Universities, Industry, Labs	Events, Conferences, Social media
B	Established companies	Basic	Smart devices, Big data	None	Word of Mouth, Paid advertisin

					g, Events and co-operation
C	Medical and digital health start-ups	Any start-ups in this industry	Digital Health, Medical Devices, Therapeutics	Corporates, Government agencies, academics, service providers	Events, Conferences, Social media
D	Early-stage potential high growth University oriented	University affiliation, IP, of benefit to the university	Engineering, Computing, Life Science	Property management, Legal firm, Marketing, Local authorities, University	University public affairs
E	Established	Survival chance,	AI, Big data,	Corporates,	Word of Mouth,

	companies	Growth, Market size, Revenue, Funding, Management team	Cloud Computing	Government, academics, investment firm	Paid advertising, Events and co-operation
F	Local companies	Background check due diligence	Lab Projects	Corporates, University, Industrial organisations	Word of Mouth
G	Early-stage companies	Undecided	Life Sciences	Corporates, Government, Universities	University public affairs

Table 3: The Demand side – The current and potential tenants that were interviewed

Tenant	Current Job	Location	Education	Role
I	Engineer	Ireland	BS	Potential tenant
II	Start-up Founder	US/China	PhD	Existing tenant
III	VP Research	US	PhD	Potential tenant
IV	Start-up Founder	US	PhD	Exiting tenant

In addition, a partner, an R&D Director from a top 10 pharmaceutical company, was interviewed to give a more external view. The interview data was collected into themes and presented in the results section below.

3. Results and Discussion

According to the 7 interviewed incubator managers, they offer a common set of business support services to their customers but would provide specialised services with selective programs with or without costs based on the needs of the clients. These are summarised in Table 4.

Table 4: Services Provide by each Incubator

Organization	A	B	C	D	E	F	G

Human Resources							
Coaching	**Y**	**S**	**Y**	**S**	**S**	**X**	**S**
Expert organisation	**Y**	**S**	**Y**	**S**	**S**	**X**	**S**
Business expertise on site	**Y**	**S**	**Y**	**Y**	**S**	**X**	**Y**
Experienced managers	**Y**	**Y**	**Y**	**S**	**Y**	**X**	**S**
Technological Resources							
Infrastructure	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Know-how	**S**	**X**	**S**	**S**	**X**	**X**	**S**
Technology/ideas	**Y**	**S**	**Y**	**S**	**S**	**S**	**S**
Financial Resources							
Access to Capital	**Y**	**Y**	**Y**	**S**	**Y**	**X**	**S**
Financial support and consulting	**Y**	**Y**	**Y**	**S**	**Y**	**X**	**S**
In Kind support	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Organisational Resources							

Programme milestones, clear policies and procedures	**Y**	**Y**	**Y**	**S**	**Y**	**X**	**S**
Selection process for tenants	**S**	**Y**	**S**	**X**	**Y**	**X**	**X**
Technology transfer and R&D	**S**	**X**	**S**	**S**	**X**	**X**	**S**

Y = Yes, offered as standard X = No, S= Provided with selected programmes or events

3.1. The rational for what incubators currently offer

As can be seen from Table 4, the offering of services between the different incubators was quite different, so the interviews asked more detail about the rationale for the incubator's offerings. For Organization C "*The facility includes simulation labs that are set up like a hospital, tenants can go in and practice to test if their idea would work. Closed door roundtable with the best thought leaders in the industry, digital health forum and health system forum are part of the incubator program. The organisation also provides over 100 hands-on workshops covering business plans and marketing etc."* If a start-up identifies a need or a gap, the organisation would source solutions that fit the criteria from different members, mentors and corporate partners to co-develop a solution to close the gap. The organisation does not take equity from the start-ups but offers help

with fundraising. The organisation is currently creating an angel investing network and there are showcases that allow start-ups to pitch to an open audience with potential investors.

Organisation D had a pipeline model for biotech companies in 3 stages which allowed natural growth. Firstly, a lab for early-stage start-ups with the core strategy to help people get started, the tenants get some bench space and desk space. There is common shared equipment and lab services (such as waste removal and glassware), and new equipment is constantly being purchased to suit the needs of the tenants. *"Start-ups that need some lab space and don't have money to buy equipment, this is a great place to start with – all that's required is a low-cost membership."* (Organization D) When tenants move beyond the proof-of-concept stage, and they want to control the science environment to avoid cross contaminating lab samples with other researchers they can move into the Innovation Centre. This is set up either for new start-ups that have sufficient capital or start-ups that are scaling rapidly that require their own dedicated space. Tenants usually start off in one module, and as they grow, will add additional modules to suit. The modules can be cancelled with 60-day notice, so tenants are not stuck in long term leases. Some shared equipment is provided (such as autoclaves, conference rooms, ice, and deionized water) and support services are accessible such as medical waste removal. *"The benefit is that tenants don't have to do any build out, and don't have to invest in things like electrical or mechanicals to support their labs."* (Organization D). Usually, tenants stay at the Innovation Centre for a few years but there is no exit policy or time limit. When tenants decide to graduate from the Innovation Centre, they might need half or a full floor of a customised building, which is offered as a next step.

Organisation F intends to serve an already established demand and to serve as many people as possible with lab space for the local business community and universities. Their target customers are local individuals or companies who *"just want a place to use the equipment that they wouldn't have access to at home"* (Organization F). They described themselves as an entry level real estate incubator. It started as non-profit, with no equity required from tenants and no financing provided. The aim was to create an entity that would operate a shared lab space for start-ups, "*originally the idea was to create an affordable accessible space where people could experiment. Tenants pay monthly rent to use the shared spaced and shared equipment that they don't have access to at home and may not have a dedicated lab bench. There isn't any particular teaching or curriculum affiliated. The average duration is a couple of years, as tenants need a year or two to develop their technology"* (Organization F). The revenue stream is rent collection/ membership fees, and organisation F has now turned from non-profit into for-profit after operating for 2 years.

In addition, it was noticed that, due to COVID-19, "*There seems to be more demand than ever for lab space as more and more investment going into biotech"* (Organization A) and "*it was filled up with companies joining on short-term to work on COVID-19-related projects"* (Organization F).

3.2 What tenants required from an incubator facility

Firstly, we attempted to understand what the tenants wanted from an incubator. Start-up founders commented;

"For us, because we are life sciences company, lab equipment, but, other things we've been interested in are funding opportunities, angel investors, or opportunities to be able to network with Venture capitalists who have histories of being able to provide capital to small companies in our

specific areas. IP, law services are incredibly expensive, so it is better to have any type of help to be able to set up an IP strategy that would be definitely beneficial. And then network with peers, other people, conferences where I can do introduce our types of technologies that might be good." (Interviewee III)

Interviewee IV is in the middle of a virtual incubator program and valued the business planning and sourcing funding elements. This program is for free, with government funding support. However, the program selection criteria are quite competitive with only 6 candidates selected from a pool of 36. The incubator program runs for 10 weeks, *"it is very helpful in developing the business idea and trying to find investors as the program basically raises the related questions and provides practice opportunities"* (Interviewee IV).

"*I come from a technical background and I am working with a partner who has a tech background like me. We have this idea, and then I reached out to the incubator program. When I became part of it, I am finding out it is obviously very helpful. Especially if you are coming from a technical background, it is absolutely very helpful. What it does is, as part of the program, they ask the right questions, give you practice in terms of answering these questions. We tried to build our business idea and try to find investors and other people that we are going to work with*" (Interviewee IV).

All the interviewees indicated that other than required support/ resources, location was a critical factor in choosing an incubator. Interviewee II implied that rather than services, location matters more. *"If an incubator is in an attractive location, the incubator user is going to be set up. There are also quite a variety of incubation centres, located right in the city that are surrounded with other industries"* (Interviewee II). The potential partner also agreed that location is critical for a start-up as accessibility to resources is key. *"That's why the incubators happen in those kinds of*

biotech hubs, it is easier to get access to a lot of services or smart people or from that will attract investors… especially when you are in a start-up, you're trying to build a whole network of things" (Potential Partner)

Table 5: Summary of what services tenants required from the incubation facility

Interviewee	Company Stage	Resources/support required
I	Planning	Develop missing skills
II	Start-up	Access to capital and peers
III	Established young company	Access to capital, legal services, marketing
IV	Nascent	Feasibility assessment of the business idea, access to capital

Referring to Table 5, it seemed tenants' main aims were to gain access to capital, wider networking and access to experts such as IP lawyers – personally for the founders it seemed to be about changing from a purely technical background to gaining business skills, and IP and business strategy. For the most part, it seems that incubators were broadly offering these opportunities to tenants.

3.3. How do incubators judge success?

Incubators were judged on a variety of factors from profitability, quality of projects supported, benefit to the local ecosystem (e.g., jobs) and some university specific targets for those incubators run by the university, but whilst it was deemed important to generate revenue regardless of whether profit or non-profit, it was clear they regarded increasing the entrepreneurial ecosystem in some way was a key target;

"We are at our core a real estate team. Our sort of most important performance indicator is vacancy, ... but I think what makes it successful, is this realisation that if we're built on the chassis of a real estate company, then we should use real estate levers like this mixed-use development in order to make the community more attractive" (Organization D)

Another incubator had converted from a non-profit into a for-profit company and added that the mission determines their business model *"Given where we came from as a non-profit in the first place, we've always been a very mission focused company. And even though we are now a for-profit, that's still the same… our real focus is just making sure that we contribute and add value to our ecosystem."* (Organization F).

Research incubators are typically dedicated to the R&D facilities or universities that can provide a sector focus and target customers. Organisation G indicated that they *"hope to build some brands for the university and give them some clout".* The director stated that they targeted primarily local customers in immunotherapy and biomanufacturing for the benefits of the university and students. *"We've got to make sure that we can bring in companies, once we do so, we want to make sure that there are opportunities for students to benefit."* (Organization G).

The founders of Chinese incubators B and E expressed that there are conditions on receiving funding from government contracts, services, and partnerships. One manager stated that *"the*

government evaluates their performance every year based on the quality of projects, profitability, services, talents, and gross income" (Organization E). The funds are invested in their tenants to develop and expand by providing infrastructure, services and their "research database" for free, in return for equity or future brand name or value creation for themselves. B agreed that they could *"create bargaining power to negotiate with the local government for better tax benefits or other policies."* (Organization B).

So, despite some incubators being for-profit, success indicators were that they were adding value to the ecosystem with successful projects, jobs, and specifically for the university incubator that it would benefit the university and its students. Additionally, the Chinese incubators found that the incubator was good for generating collective bargaining power for the start-ups to lobby local and national government.

3.4. Selection criteria

There was a difference between the incubators on how they chose tenants, with varying levels of strictness of criteria. There are no highly formal selection criteria for the tenants for many of the incubators, for example, *"Ideally the start-up is coming out of the affiliated University, is in the technology or life science field, has intellectual property, is relevant to the work the University is doing, is likely to hire University graduates or form collaborative or consulting agreements with the University. It is sort of a University centric process, but it is not entirely exclusive….also invite like-minded technology companies who want to be in the ecosystem, as they often develop relationships with the University.*" (Organization D).

Organization C often selected from those graduating from University incubators "*We work very closely with a lot of the university incubators, when start-ups are done with them, they often come into our pipeline.*" This de-risks the selection process for Organization C.
There are no formal selection criteria also for Organization F, "*the incubator is built for biotech start-ups, the tenants will be evaluated for safety hazard issues and background checks, making sure they understand it is a shared environment*".

However, one of the Chinese incubators had a novel method of selection *"if the company has a provincial award or gets accepted by the national thousandth talent plan, instead of the company going out and looking for the investments, the investors will chase the start-up companies".* (Interviewee II). Further, Chinese incubators give a lot of support, but it is very competitive and is aimed at economic development by finding top talents, especially in prioritised industries. *"Once selected, the package from the incubator is tremendous, this is in the form of money, laboratory resources and space, all sorts of administrative assistance, and connection to get additional funding to either government or private source"* (Interviewee II).

As other researchers have found, many incubators are not strict about selection which could result in more start-up failures, especially real estate incubators who provide for the local area. The strategy of taking start-ups from existing pipelines or chasing those which have been validated by government funding agencies was a way that some incubators used to reduce this risk.

3.5. Partnerships

As well as potentially providing revenue for the incubator, partnerships can contribute to both start-up success rates and benefit the local economy. On one side, the incubators and accelerators provide the space, services and network that start-up companies need and partnerships can also provide services to the start-ups. On the other side, partners such as corporations, investors and upstream and downstream industries can use this platform to plug themselves into the new technologies, identify new investment opportunities, and gain access to potential customers and suppliers helping their own businesses to grow.

Organisation C has a very clear partnership program *"One thing that we do provide is the connection to all of our corporate partners, so we can do introductions of our start-ups to all our 65 different corporate partners, that's where we get them with pilots, co-developing solutions, all of that."* (Organization C).

Currently, Organisation D does not have any strategy on partnership development.
Organisation E has clear criteria for selecting partners. Since their funding structure includes the government and the large corporation, the missions of Organisation E are to promote new industry in the region, provide the large corporation with the opportunities to collaborate with innovative companies and spin out their projects. A service category, including more than 70 services, was designed covering tenants required essential and advanced support. The majority of partnerships are developed based on this services category and they are more focused on building a community. Partners who have a reputation, align with the incubator's missions and goals, and complementary

to tenants' businesses will be prioritised. A maximum 2 partners for each service type are settled in the incubator.

Overall, partnerships are an underused opportunity to gain revenue, some bring partners with different levels of privilege depending on how much they pay, but also some incubators used them as a selling point to attract tenants – bringing companies that could help the start-ups. Partnerships are a win-win as they also contribute to the ecosystem boosting start-up survival as well as contributing to the local economy by developing their own business activities.

Conclusions

There are several different models that appear to be being used successfully, incubators started their business with different approaches. Despite some being for profit, success indicators for all included adding value to the ecosystem with successful projects, jobs, and specifically for the university incubator that it would benefit the university and its students with not just start-ups, but industry collaborations and student jobs.

As expected, the location of the facility is of great importance for increasing occupancy rates. Proximity of a local university, easy access by roads and public transportation, and crucially a network of collaborators, customers and funders would be considered attractive.
Tenants main aims were to gain access to capital, wider networking and access to experts such as IP lawyers and for the founders personally they were looking to transition from a purely technical background to gaining business skills. One additional benefit that was found by the Chinese

incubators was that incubators could offer collective bargaining for lobbying local and national government.

For selection criteria, we found that for the real estate incubators selection was rather limited (by geography) and could contribute to a higher start-up failure rate. One targeted graduating companies from university incubators to de-risk tenants, whilst the incubators based in China chased companies that were backed by the government and had therefore had also been through some validation process, therefore reducing risk of failure.

Some used partnerships as a selling point to bring in tenants, contributing to start-up success rates and also bringing in revenue as a very successful strategy, whilst some incubators had no partnership strategy. Partnerships were clearly an underused resource which could have multiple benefits for the incubator, start-ups and local economy.

Recommendations

We suggest incubators could make more use of partnerships. It has been suggested that partnerships with external firms could generate on average 80% more revenue than simply rental money from tenants. This would boost the incubators profitability (or reduce the fees it charges tenants if a not for profit). This would also be of benefit to the start-ups who can use the partners services, offer them projects and help start-ups integrate more with the local business community increasing their network. This would be of benefit to the partners generating new clients and boosting their own business growth and profitability. It was clear from the research that some incubator managers were unsure about the use of partnerships or have no particular strategy to

create partnerships with external companies. For incubators to diversify income to be less reliant on rental money is also a benefit – either for increasing the incubators profitability or if a not-for-profit can pass some of that savings onto clients which will help their own cash flow and survival chances. An added benefit could be to use partnership companies for mentors and board members as there is a positive correlation between good incubator staff (including supplying board members and mentors) and better outcomes for clients (Lewis 2011). In addition, Lewis (2011) suggests 60% of incubator income on average is from rental/service fees, so maximising external support from Governments and local authorities is important to drive outcomes, i.e., allowing lower rental in return for higher job creation and successful graduation of tenants.

The quality of the start-ups accepted to the incubators could be improved, as for some incubators no formal selection criteria was used, simply that you were associated with the university, or that you had the ability to pay. A criticism of the incubator process is that it simply keeps alive a company that would be unable to survive under normal commercial conditions and that stricter selection criteria would contribute to both client and incubator success; therefore, it might be useful to provide a filtered pipeline to the physical incubator using a virtual incubator first. As an entry point, a virtual incubator service is recommended. This concept would allow attracting tenants from all of the world without geographical limitations and the virtual services could be run out of the physical incubator location which would minimise costs. Successful companies could then locate at the physical incubator. Since much of the aim of the incubator was to allow testing of ideas and preparing of a more serious business plan to become investment ready, to an extent a virtual incubator allows that before the commitment to renting a physical space. Many of the tenant's founders suggested they wanted to use an incubator for skill building, seeking funding,

networking and business planning – much of which could potentially be done virtually. For the incubator, the virtual option could also act as a low-cost pre-screening of potential tenants. This could allow a pipeline of start-ups that would have more chance of being successful having gone through the virtual programme. This might work especially well for digital healthcare ideas and would match requirements at each stage of the start-up with what could be offered by an incubator – a funnel process starting with incubator, then the lab space for some testing, then some specific space for establishing the company. Whilst there are issues in creating networks for virtual start-ups, this could be offset by ensuring that the virtual incubator provides good mentoring and board members which has been shown to be a positive correlation of success for clients and therefore incubators. Should a good incubator be the victim of its own success, with successful companies leaving the incubator regularly (Hackett and Dilts, 2004), the virtual route will help have new tenants ready to join to ensure a high occupancy rate. The China based incubators identified tenants from those that had won prestigious awards, so essentially were pre-validated, this could be a suitable strategy elsewhere also.

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How Open Innovation Digital Platforms (OIDPs) can facilitate and support innovation activities

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Abstract

The main aim of this study is to explore to what extent Open Innovation Digital Platforms (OIDPs) can facilitate and support innovation activities of companies and Small and Medium enterprises (SMEs) indeed. Specifically, it intends to investigate what are the main capabilities that organizations develop to seize the opportunities provided by OIDPs.

The study would carry out an exploratory qualitative analysis, adopting multiple–case study to arrive at a comprehensive and in-depth understanding of the OIDPs mechanism but at the same time to develop more general theoretical statements about main organizational capabilities.

The multiple case study sheds light on how Open Innovation Digital Platforms supports all the phases of interactive coupled OI processes and knowledge co-creation through its processes, tools and services as a co-creator intermediary.

In particular, the study suggests practical ways in which OIDPs could be used by firms for effective exploration, acquisition, integration and development of valuable knowledge.

Therefore, the main original practical and theoretical contribution of the project is the conceptualization of the role of OIDPs in shaping knowledge co-creation, assuming that the platforms act as Open Innovation Intermediaries (OIIs).

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