

CONCEPTUAL FRAMEWORK FOR STRATEGIC ENTREPRENEURSHIP
MANUFACTURING SME IN INDIA

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Dedication

This would have not been possible without the Grace of Lord Jesus Christ; his kindness and goodness has enabled me to reach so far.

Continuous support from my wife and daughter provided the impetus and inspiration to keep going forward.

I dedicate this to my lord and family.

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ABSTRACT

MANUFACTURING SME IN INDIA CONCEPTUAL FRAMEWORK FOR STRATEGIC ENTREPRENEURSHIP

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2024

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Strategic entrepreneurship essentially can be considered as a creative combination of strategic management principles and entrepreneurship principles to achieve superior returns and generate wealth. Indian Manufacturing sector currently struggles to achieve and sustain superior performance under volatile and dynamic market conditions (VUCA conditions) Competition from Chinese manufacturing firms further threatens the very viability of many manufacturing firms in India. Strategic entrepreneurship construct and principles will greatly help such firms to navigate the VUCA conditions and compete successfully. Currently there is no specific implementable or guiding framework which management of manufacturing firms in India can adapt. This research intends an implementable guiding framework.

Strategic entrepreneurship is still evolving as concept. Scholars continue to debate regarding its boundaries and dimensions. There are various concepts in literature to tackle dynamics in marketplace and business environments, creative practices in business administration, more recently digitalization strategy has become part of management

practices. These theories concepts tools and methods are segregated in various domains. This research will creatively integrate this topic in context of strategic entrepreneurship. This is done first by performing extensive literature review in creativity, and how dynamic capability and digitalization of manufacturing systems are manifested and developed. A small survey of detail interview is conducted to understand the managerial competence with respect to strategic entrepreneurship elements in manufacturing SMEs. A new conceptual framework is developed and proposed with addition of new elements. With this element strategic entrepreneurship construct is made applicable to manufacturing SMEs.

Directed by: **Velimir Srića**

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CHAPTER I:
INTRODUCTION

1.1 Introduction

Last two decades India has seen a phenomenal rise in GDP. Income levels and overall, the economic conditions are in an upward trend. As the Indian economy progress manufacturing and particularly SMEs are playing a vital role in sustaining the cost advantage that the developing nation like India provides compared to the developed nation. This cost advantage is now under threat. As the living standard improves in India resources are becoming costly, global competition from other developing nations, technological advances in manufacturing and technology disruptions are now a practical possibility. Environmental challenges have put limitation in exploiting natural resources. All these factors have created an extremely challenging environment where both the market and resources are getting more volatile, uncertain, complex, and ambiguous (VUCA)

Strategic entrepreneurship essentially can be considered as a creative combination of strategic management principles and entrepreneurship principles to achieve superior returns and generate wealth. The Currently available constructs and themes of Strategic management can strongly provide essential managerial guidance for managerial and firm level actions to navigate the current challenges manufacturing SMEs in India faces. It is vital for SMEs and new start-ups in India, to implement strategic entrepreneurship practices to maintain their performance, profitability, business viability and competitive advantage. Implementation of advanced technology and

innovation alone are not enough which many SMEs and start-ups are beginning to adopt as the first line of defense against the survival threat they perceive. It is vital to formulate and implement modern management practices, modern strategy development tools and methods in entrepreneurship and strategic management to obtain superior financial performance.

A conceptual framework for formulating and implementing strategic entrepreneurship for SMEs in India, such a framework would enable firms to identify and exploit opportunities, identify, and seek advantages for superior performance in the current VUCA Business environment. Framework would also account for the creative aspect of generating a product definition or service offering once the opportunity of advantage is identified. Manufacturing sector in India, is growing at relatively slower rate compared to IT Sector. For manufacturing sector there are resources challenges, there challenges of inconsistent market demands, disruption in supply chain and stiff international competition (especially from China). There are opportunities with new megatrends on the horizon such as electrification of automobiles, solar and wind power in renewable energy, Strategic emphasis on localization of manufacturing and R&D activities through “make in India initiatives” and strategic emphasis on local development and manufacturing of defense equipment’s such as aircrafts and armored vehicles.

Manufacturing sector in India is considered for the research. Considering the challenges and opportunities this sector in India is characterized, it is essential for this sector to operate and organize economically and efficiently. It is essential to have

sustained economic returns to attract the vital resources (Both Human and financial) to the sector. While the modern management practices have been widely adapted in India IT Sector Manufacturing sector lags.

Strategic entrepreneurship concepts as defined and available should be benefit the Manufacturing sector in India. A more generalized theories and tools are available but there are no specific theories or tools with respect to manufacturing and manufacturing in developing nation like India. Further in more general aspect examination of the extant literature suggests that there is still ample room for scholars to contribute to properly defining SE, understanding exactly how SE is manifest in organizations, uncovering relevant opportunity internal and external environments for SE to pervade, and identifying pertinent consequences and results from successful SE (Mazzei, 2018). Positive influence of exploration and exploitation on firm performance has been observed in earlier studies conducted (Shirokova et al., 2013). This thesis will try to broaden the SE constructs integrating modern cognitive tools for idea generation, innovation management and business organization.

1.2 Research Problem

Indian IT Sector remains at forefront of adapting the modern tools and techniques in management, operations, and organization of their enterprise. The global network and alliances of IT firms places them in unique position to adapt best practices and gain superior knowledge resources in management. The manufacturing sector is more localized with rigidly defined activities. External interaction remains limited. This sector comparatively lags in generating knowledge-based resources in management. It

is challenging for the organization in this sector in India to lead in innovation, product development and technology (With respect to developed nations). It is challenging to generate sustained superior financial returns. Competition from neighboring countries is fierce as firms from China remain highly price and technology competitive. Strategic Entrepreneurship (SE) constructs and methodologies would highly benefit these sectors, A SE framework which provides managerial action and guidelines to efficiently operate and organize would be highly effective tool. Manufacturing industry specific guiding Strategic Entrepreneurship (SE) framework, tools and managerial methods providing positive probable outcome in exploration and exploitation of business opportunities and further strengthening their position and orientation against competition and dynamic business environment is highly desirable in current business environment.

SE Broadly remains evolving. The governing aspects of the SE construct remain more generalized to varied industry domains. Exploration and exploitation remain one of the central pillars of SE Construct with creative dimensions, yet no methods and tools are encompassed within the construct. More recently management tools like Design thinking (design led strategy), Business model regeneration, digitalization and such like have evolved in management. Business opportunities remain vaguely defined within the construct. Majority of the researchers and leading thinker consider business opportunity to be “Opportunity”, but the definition can be extended further to encompass business orientation and organization for reducing barriers for profitability

or neutralizing Michael porters five forces acting against growth and superior economic gain.

Furthermore, recently supply chain disruption due to the covid 19, Ukraine war and Geopolitical situations in east Asia have impacted the financial performance and strategic orientation of the organizations. The management, organization and operational aspects of the supply chain must be effectively integrated into strategy to achieve sustainability in economic and entrepreneur performance. Currently the SE compass meagerly considers the effects of such disruption.

The rate at which technology changes market demands fluctuate remains high. The constant changes in technology trends and market demands pressurize the capacity utilization of manufacturing resources of firms. Designing, organizing, and developing manufacturing resources in a competitive strategic way has become imperative. Integrating the modern agile manufacturing strategies and considering such activities as critical knowledge and competitive resources will provide sustained competitive advantage, This Manufacturing Resources now needs to Consider from SE standpoint of view to further exploit and explore the new opportunities and position such a strategy may provide.

Strategic entrepreneurship should provide a framework a set of guidelines for managerial decision making within the organization. This framework should lead for efficient application of SE. This research would like to add to the definition of the SE new elements, new tools, and methods to make it more specific to developing countries

and particularly manufacturing sector. Following topics would be broadened in the existing SE Construct:

1. Creative aspect in exploration and exploitation of opportunities: Creativity is vital for innovation. More recently modern management practices have tried to address the cognitive aspects of decision-making. Methods like design thinking for product or service idea generation are being advocated. Design led strategy has also been proposed more recently. But there is no framework postulated to integrate them more efficiently with management decision making process. Creativity is vital to innovation. Creative and innovative methods must be employed for exploration and exploitation. The framework for idea generation, evaluation and development remains currently meagerly defined within SE construct.
2. Entrepreneurial and strategic methods in Dynamic Business environment: enterprises and organization consist of assets and set of competences. Every enterprise big or small do have some strategy in place to exploit the assumed or evaluated opportunities in the market. Both the assets and competencies are majority of the time developed under static business environment or assuming the business environment would not change in immediate future. By immediate means at least till the investment done in assets and building competence is recovered with profit levels higher than the prevailing inflation rate. The assumption of static nature of business fundamentals and business environment needs thorough introspection and critical evaluation. Modern day business environment in developing nations is not static in nature but is dynamic. Strategic entrepreneurs require to integrate the scholarly

proposed methods for strategy building and entrepreneurial pursuits within its construct.

3. Digitalization in context with manufacturing and manufacturing related firms: Digitalization is one of the vital pillars of the fourth industrial revolution. (Industry 4.0). Many advance technologies that are designed and developed to improve efficiency and to improve manufacturing competence have their foundation in digitization. Digitization of manufacturing process and agility in manufacturing methods will provide firms with the requisite Strategic and entrepreneurial orientation against the market forces and stability in dynamic environment, considering this aspect it can be argued that the Agile and Digital Manufacturing should be, and explicit aspect Strategic Entrepreneurship as applied to manufacturing sector. Building on digitalization supply chain design and management can be considered within the broader frame of value chain management. Value chain management which considers provides a very wholistic view of the business chain and process will provide good tools and techniques to account for disruptions and importantly it would provide more information in process chain to the business leaders. This amount of information and the closer insight availed by considering supply chain within the frame of value chain management will help leadership team to identify new opportunities within and outside the industry segment. Thus, value chain management method within the SE construct will help entrepreneurs to identify new business opportunities while designing strategies to have business continuity in

face of disruptions. Thus, value chain management built of digitization is considered within the SE Construct.

1.3 Purpose of Research

Objective would be to propose Strategic Entrepreneurship (SE) framework broadening the existing framework and adapting the existing framework to Indian specific manufacturing firms. The proposed framework will be based on the study of extant literature, scholarly articles and academic propositions postulated for gaining superior returns. From literature review understand what methods exists and are proposed to obtain competitive advantage and above market average entrepreneurial outcome

Broadly the objective of generating a broader SE framework will be achieved by two methods as follows.

1. Extensive literature review to understand the management practices, methods various tools that are proposed in literature for business conditions that are analogous to the conditions faced by Indian SMEs in manufacturing sector. The current Strategic entrepreneurship framework is developed and designed for static business environment. The challenges which SMEs in manufacturing sector in context with management practices and management decision making are radically different. Thus, from literature review methods and tools will be identified to augment the SE framework to account the dynamic nature of business environment. These methods and literature will be reproduced here and argued its relevance to strategy and entrepreneurship (especially for SMEs in

manufacturing sector) and further postulate its applicability and suitability in strategic entrepreneurship framework.

2. Conduct extensive in-depth interviews with strategic level decision-making stakeholders of an enterprise particularly of small-scale industries in manufacturing sector. The Interview will be focused on existing element of strategic entrepreneurship and on the proposed new element of strategic entrepreneurship. An assessment will be made about how leaders and managers in manufacturing SMEs understand and make use of the techniques, methods and postulates proposed in SE construct. Objective of the interview will be evaluating qualitatively the level of managerial understanding of SE management constructs both existing and proposed. Managers and leaders are the main key decision makers and key members for formulating the entrepreneurial strategy their cognitive ability to utilize tools and techniques as proposed in traditional literature and in modern literature will determine the effectiveness of the formulated strategy and the effectiveness of method deployed for business opportunity exploration and exploitation. The in-depth interview should provide a decision-making pattern, level of understanding of managerial methods and barriers experienced by leaders and managers. This information will help the framework development process to develop implementable and relevant guideline.

1.4 Significance of the Study

From preliminary literature review there are no studies identified that at the minimum that is at philosophical level that integrate the two aspects of current business that are dynamism and competition. These two aspects are new realities for any firms or enterprises that will try proposer in their market segment. These aspects are barriers for growth, sustainability and for superior returns (above market average). Orchestration of superior strategy is an important function of managers and leaderships cognitive and entrepreneurial capability. Similarly, identification and once identified exploration and exploitation of opportunity to gain competitive advantage is function of managerial capabilities. For bigger firms or MNCs due to the resource availability they have a superior management and leadership. For SMEs with limited resources and often time limited capabilities in managerial decision making it is difficult to orchestrate superior entrepreneurial strategies. This can be fundamental reason for below par performance of the firm with good business and market fundamentals. These study aims to generate a framework integrating dynamism and increased competition in context of manufacturing SMEs in India.

This thesis will generate a consultative framework for orchestration of strategy and for exploration and exploitation of opportunities for SMEs in manufacturing sector. This will be done by augmenting the existing SE Construct with new topics. Academically this thesis will broaden the definition and scope of Strategic entrepreneurship philosophically and practically. Sufficient arguments and relevance will be generated in this thesis to integrate the identified topics with the ambit of SE.

1.5 Research Purpose and Questions

As Discussed, earlier business and enterprise leaders and managers face managerial decision-making challenges in context two major top-level questions and this study will try to answer these questions [through development of a framework] which are as follows.

- Under dynamic Market Conditions what strategies needs to be adopted. How organization and enterprises can be made resilient to dynamic business forces?
- Competition both internal and external is growing. Opportunities are shrinking. How enterprises under severe competition still successfully explore and exploit and in turn grow?

CHAPTER II: REVIEW OF LITERATURE

2.1. Introduction to Strategic Management

(Hitt et al., 2001) and (Ireland et al., 2003) tried to frame strategic entrepreneurship as a management and academic construct. Strategic entrepreneurship essentially can be considered as a creative combination of strategic management principles and entrepreneurship principles to achieve superior returns and generate wealth. Literature on the constructs of entrepreneurship and strategic management are abundantly available and formulated by many researchers and academicians. In management literature these topics strategy and entrepreneurship are well researched, documented and it is practically well practiced by many organizations and firms. The goal of this literature review will be to identify how exactly the integration of two constructs entrepreneurship and strategic management with the intention of strategic entrepreneurship is achieved. The review did not consider or concentrate on the individual research on the topics of strategic management or entrepreneurship. Rather the review considered is for strategic entrepreneurship topic exclusively. The components of the strategy and entrepreneurship contributing to the topic of strategic entrepreneurship (SE) are considered for this review.

The review of literature for strategic entrepreneurship is concentrated on the following topics.

- **Definition of strategic entrepreneurship, its dimensions, construct, and theory.**

This topic will concentrate on literature explaining questions like how strategic entrepreneurship defines what its founding constituents are, how the definition and

its elements evolved, and finally evaluation of the status or extent of research on the strategic entrepreneurship topic. The review presents the views and research of different authors chronologically.

- **Strategic entrepreneurship in firms and SME Context, frameworks, and applications.**

This topic will investigate the literature and what existing frameworks are available, where their application has been researched or studied and applied practically in organizations or firms.

- **Scholarly work and studies on exploration and exploitation.**

Simultaneous exploration and exploitation can be considered the fundamental principle of strategic entrepreneurship. Hence it is vital to understand how researchers have approached this topic from an academic and management perspective. The elements of exploration and exploitation that can be contributing to strategic management construct will be reviewed. Fundamental research on the individual topics of exploration and exploitation with potential application to strategic entrepreneurship will be reviewed.

Google Scholar, EBSCO, ABI/AMRO databases are used for research. Academic journals, reports, and peer-reviewed articles were considered. Starting chronologically, each relevant work is explained in detail and finally, a summary is presented highlighting the major themes.

2.2. Definition of strategic entrepreneurship its dimensions construct and theory.

(Hitt et al., 2001) First proposed to integrate strategic management and entrepreneurship and formulate a new management stream Strategic entrepreneurship. They observed that the changes in the business environment are faster, and uncertainty is greater. The creation of wealth being the objective of entrepreneurship and strategic management, they argue the integration to be a logical progression that would generate wealth. They considered strategic entrepreneurship to be an action an entrepreneurial action with a strategic perspective. Entrepreneurship is defined as the identification and exploitation of previously unexploited opportunities, strategic management consists of a set of commitments, decisions, and actions designed and executed to produce a competitive advantage and earn above-average returns. They construed strategic entrepreneurship in several important organizational domains and proposed in the context of External networks and alliances, resources and organizational learning, innovation, and internationalization. In the same paper, they tried to explain SE using various developed theories like resource-based view, organizational learning, Schumpeter's arguments on entrepreneurial activity, network theory, and to a lesser extent transaction cost economics, efficient markets, and contingency theory. This work considers a limited framework but provides the spark that fuels future research. Further in 2002 (Hitt et al., 2002) explored strategic entrepreneurship by integrating the concepts of firm actions that research in the entrepreneurship and strategic management literature shows to be relevant to the creation of wealth. They showed how firms use their resources to explore and exploit entrepreneurial opportunities and then identify the competitive value of an opportunity. They explore the use of alliances,

innovation, and networks in entrepreneurial processes. They examined international entrepreneurship and how top managers contribute to entrepreneurial and strategic actions that facilitate and support the internationalization of their firm.

(R.Duane Ireland et al., 2003) Argued that Strategic entrepreneurship (SE) is a unique, distinctive construct through which firms can create wealth. According to them, New entrepreneurial ventures are effective in identifying opportunities but are less successful in developing competitive advantages. Established (bigger firms) often are relatively more effective in establishing competitive advantages but are less effective at identifying new opportunities. they propose a theoretical framework that defines SE Dimensions integrating Several theoretical bases, including the resource-based view (RBV) of the firm, human capital, social capital, organizational learning, and creative cognition. The construct proposed addressed how combining and synthesizing opportunity-seeking behavior and advantage-seeking behavior leads to wealth creation. To effectively combine strategy and entrepreneurship entrepreneurial mindset, entrepreneurial leadership, and entrepreneurial culture are required. They identified the need for research to understand further how competitive advantage is sustained by established firms and how opportunity is exploited by new firms. This study along with previous studies by (Hitt et al., 2002) provided the fundamental elements of SE as a management topic and proved this topic to be of value and importance to business firms. Although these studies do not elaborate more on methods of implementing the proposed constructs.

Practical obstacles where now begin research, one particular study can be highlighted here (Ketchen Jr. et al., 2007) Observe that both small and large firms face

obstacles while pursuing strategic entrepreneurship. They argue that small firms' opportunity-seeking skills may be strong, but their limited knowledge of stocks and lack of market power impede their ability to enact the competitive advantages necessary to derive value from opportunities the firms choose to pursue. In contrast, large firms are skilled at establishing competitive advantages, but their emphasis on the efficiency of their existing businesses often undermines their ability to continuously explore additional opportunities. Building on a variety of theories, including network, learning, resource-based, and real options, they suggest that collaborative innovation can enable both types of firms to overcome their respective challenges. Collaborative innovation according to them is the pursuit of innovations across firm boundaries through the sharing of ideas, knowledge, expertise, and opportunities. Small firms contend that pursuing entrepreneurship collaboratively allows them to preserve their creativity and flexibility while mitigating the inherent liabilities of smallness. These studies do not emphasize the VUCA business environment, how this would affect their pursuit of SE implementation and adaptation.

(Ireland and Webb, 2009) Tried to further the concept of SE by integrating the Uncertainty element. They argued that managing uncertainty effectively is one of the most significant challenges a firm's decision makers face and strategic entrepreneurship can be a means through which uncertainty can be managed. strategic entrepreneurship enhances organizational decision-makers awareness of the uncertainty associated with its competitive strategy in a complex global business environment. Uncertainty may not be static but rather changes over the period which may affect the firm's strategic advantage.

SE which involves continuously exploring and exploiting opportunities enhances firms' ability to identify future sources of competitive advantage. They highlight the structural, cultural, and operational differences between exploration and exploitation, and the conflict of resource allocation between these two distinct activities and thus proceed to propose methods for transitioning between these two activities. They proposed to have a plan, key considerations in this plan include setting expectations, establishing a clear timeline with milestones, having contingency plans in place, and justifying changes to stakeholders. They conclude that the iteration and fine-tuning of the plan would be required over the period to achieve an effective and efficient transition from exploration to exploitation for superior firm performance. This particular paper provided an overall top-level action plan, but this study does not sufficiently account dynamics of the market and supplier chain environment.

(Schindehutte and Morris, 2009) Proposed that SE should be concerned with the realities confronting decision makers in contemporary contexts about how to harness the creative potential of complex dynamics in a systemic approach that creates, grows, and amplifies value throughout the system. SE should not be limited to quantitative features like attaining superior financial performance or growth, qualitative features should be also accounted. Authors Identify five areas and elaborate on these areas, they postulate more developmental necessity to enhance the concept model of strategic entrepreneurship (SE): The identified areas are exploration-exploitation, opportunity, newness, micro-macro interaction, and dynamics. They propose that for a business characterized by fluctuations, irreversibility, nonlinearity, and instabilities Complexity science is an effective

methodology to understand and further enhance the application potential of Strategic entrepreneurship.

(Kuratko and Audretsch, 2009) Provide an overview of the different perspectives contained in strategic entrepreneurship (SE) and he further argues for the importance and necessity of embracing diverse views rather than attempting to restrict the analysis of SE. A strong reference is made to the work of Covin and Miles, (1999) who propose that Strategic entrepreneurship can take one of five forms—strategic renewal, sustained regeneration, domain redefinition, organizational rejuvenation, and business model reconstruction. These topics are elaborated further, and they conclude that the definition of SE cannot be restricted to a few constructs or parameters.

(Kyrgidou and Hughes, 2010) Tried to redefine the meaning of “strategic entrepreneurship” (SE), its constituents, and its operation. They identified eight core components drawn from entrepreneurship and strategic management that capture conditions necessary for its application. These eight components are dynamic capability, resource management, innovation, vision, growth, flexibility, opportunity exploration and exploitation, and acceptance of risk. These eight core components of SE construct are argued to pose limitations such as time and spatial consideration of exploration and exploitation activity (Whether to perform simultaneously or sequentially), they argue the strategic SE is less practically implementable, there is a lack of reference to internal organization design or the governance and financial control strategies, for the risk associated with the SE Process and dynamic capabilities are not elaborated. They proposed an alternate model with the addition of a few activities to the eight core activities identified.

These activities create an internal environment and top management vision, iterative learning, and contextual organizational dexterity.

(Agarwal et al., 2010) Developed implications of the link between knowledge spillovers and strategic entrepreneurship. Considering together, the concepts of knowledge spillovers and strategic entrepreneurship provide a valuable analysis of the causes and consequences of entrepreneurial action toward either creation or appropriation of value through investments in knowledge. They argue that many organizations fail to appropriate all the value they create due to the differential value they assign to the knowledge they create which also limits Organization engagement in market transactions for knowledge transfer that would allow it to the appropriate value. Finally, they conclude that by linking twin concepts of knowledge spillovers and strategic entrepreneurship and examining the issues at their interface it is possible to understand the causes and consequences of value creation, value appropriation, diffusion of knowledge, and ultimately, the growth and prosperity of regions and nations.

(Pereira and Naguib, 2016) Proposed the use of dynamic flexibility as a useful capability to address strategic entrepreneurship, by exploring the modulation response model and different other references from both strategic management and strategic entrepreneurship literature. Using concepts such as strategic flexibility, strategic adaptation, dynamic flexibility, and the "complexity-variety" problem, the time-resource problem integrative framework of strategic entrepreneurship and dynamic flexibility was proposed. They conclude dynamic flexibility to be a key feature of strategic entrepreneurship. Further they observe that entrepreneurial ventures develop strategic

flexibility using capabilities of dynamic adaptation to avoid the risks of relying on static flexibility or inventory.

(Simsek et al., 2017) They consider strategic entrepreneurship ill-defined and under-developed as a theoretical construct. They see less clarity around what constitutes the core features and distinctive identity of strategic entrepreneurship. They provide a scholarly discourse on the conceptual identity, boundaries, and precision of strategic entrepreneurship as an organizational construct. They provide an answer to pertinent questions like how, where, and when the integration of strategic and entrepreneurial dimensions takes place. They postulated parameters constituting entrepreneur and strategic actions. Finally, they speculate that strategic entrepreneurship may be better considered as an umbrella, profile concept of the various ways in which strategic and entrepreneurial actions, cognitions, and capabilities are combined both within and across firms.

More recent scholarly discourse is provided by (Keyhani, 2021) where he attempts to clarify the construct of strategic entrepreneurship by comparing the ideal-type theory of strategy without entrepreneurship with the ideal-type theory of entrepreneurship without a strategy. He argues that the logic of strategy without entrepreneurship is a logic of structures and constraints. The logic of entrepreneurship without strategy is a logic of action and change. Entrepreneurship is blind without strategy and strategy is paralyzed without entrepreneurship. He provides concrete examples of reliable mechanisms of sustained competitive advantage even in the face of Knightian Uncertainty as he considers disequilibrium and uncertainty do not automatically mean that no predictable and stable patterns can be relied upon for sustained competitive advantage. In conclusion, he provides

logic to combine the logic of entrepreneurship and strategy. In this discourse, the effectiveness of SE Construct to generate superior returns and the constructs' ability to face uncertainty and dynamic business elements is re-established.

2.3. Strategic Entrepreneurship in firms and SME context, framework, and applications

(Kotha, 2010) Performed analysis of the commercial aviation industry (in the USA) arguing strategic entrepreneurship along with knowledge spillovers and spill-ins, played a decisive role in the emergence and evolution of the commercial aviation industry. In this study author undertook extensive interviews with Boeing managers responsible for the development of new planes, they found compelling evidence of knowledge spill over and spill in the development of new planes and programs for defense in the American aviation industry. They observe the effect of knowledge spillover and spill-in from German aviation to American aviation, the investment performed by the American companies the risk taken by these investments provided a huge competitive advantage to these companies, further, they observe the commercial opportunities in the aviation sector were better exploited by American aviation firms. This study is interesting in the context of strategic entrepreneurship as its outcome in critical technology sectors like aviation proves the construct of strategic entrepreneurship provides real competitive advantages along with sustainable wealth generation.

(Luke et al., 2011) Studied state-owned enterprises (SOEs) in New Zealand undertaking entrepreneurial and strategic activities between 2006 to 2007. They examined the integration of entrepreneurship and strategy to develop a conceptual framework of

strategic entrepreneurship. Their framework finds strategic entrepreneurship comprising of three main concepts 1a. Strategic entrepreneurship is a distinct process, founded on bringing something new to the market; a combination of innovation, opportunity identification, and growth. 1b Strategic entrepreneurship is a process represented by four key aspects of entrepreneurial activity, applied in the strategic context of businesses, which develop expertise within their core skills and resources, and leverage from that by transferring and applying their knowledge of those skills and resources to new products, services, or markets. 2. The nature of strategic entrepreneurship may take various forms, ranging from incremental to radical innovations, with deliberate to emergent approaches 3. Strategic entrepreneurship offers the potential for financial benefit, subject to management changes in both internal and external forces. Their findings are encouraging, they find strategic entrepreneurship a practical construct for wealth creation through increased financial returns in SOEs. Although the study is limited to state-owned enterprises, the authors strongly believe it can be extended to private enterprises.

(Obeng et al., 2014) Investigated the determinants of small firm growth in Ghana with respect to the strategic management concepts. They relied on three main leading theories on firm growth, the three theories are the Resource based theory (RBT) developed (Penrose, 1959) and (Jovanovic, 1982) theory of Selection which primarily postulated small firms grow faster as they learn, and develop their efficiencies and finally on Storeys framework (Storey, 1994) for small firm growth relating the characteristic of the entrepreneur, firm and firm strategy. Based on these theories they further developed hypotheses that related a firm's growth to investment in research and development, human

capital, social capital, innovation, and exporting. They found several positive relationships between firm growth and the characteristics of the entrepreneur, firm resources, and firm strategy in a developing country like Ghana. The research produced evidence proving the relevance of the Strategic management framework in the context of developing nations.

(Omoshagba et al., 2021) Studied the impact of strategic entrepreneurship on the performance of Nigerian banks. The study demonstrates that strategic dimensions of entrepreneurship like strategic renewal, sustainable innovation, and domain renewal effects significantly affect organizational performance. From their research they concluded that strategic renewal independently influences organizational performance, domain renewal had insufficient influence, and sustained regeneration had a negative influence. Nigerian banks do not have the knowledge and financial commitment for the exploitation of opportunities. strategic entrepreneurship is still in the infancy stage in the Nigerian banking sector. Their study concludes that strategic entrepreneurship components jointly and independently influence the performance of Nigerian banks. This study was limited to the banking sector only.

(Hughes et al., 2021) Studied young technology-based firms in the UK. They postulate that young technology firms are deficient in resources and knowledge in strategic context but are high in scope for entrepreneurship. Their study is essentially based on the premise that it is difficult to distribute resources to both activities of SE, exploring and exploiting. They provide a new theoretical rationale and model of innovation ambidexterity. In this model, it is seemingly opposing dimensions of strategic entrepreneurship opportunity-seeking and advantage-seeking, and innovation theory co-

align in young technology-based firms. Innovation Ambidexterity is balancing between simultaneous exploration and exploitation activities (Simsek, 2017). Their findings from the study led them to conclude strategic entrepreneurship behaviors are an enabler of explorative and exploitative innovations. Their study finds competing interrelationships that both ease and worsen the tensions associated with innovation ambidexterity, further they state that this conflict can be reconciled by managing the patterns of conditions with entrepreneur orientation EO (entrepreneurial mindset and entrepreneurial culture), accessing relational resources, and relational embeddedness. Their study provides ample evidence for the application of SE for competitive advantage and superior returns in technology firms.

2.4. Scholarly work and studies on exploration and exploitation

Simultaneous and continuous exploration and exploitation can be considered as fundamental principle of strategic entrepreneurship. It is important to understand how researchers have approached this topic from an academic and management perspective. The literature available on this topic is vast, we limit our review to the most cited and studies relevant from a Strategic entrepreneurship point.

(March, 1991) Studied the individual nature of exploration and exploitation activities and tried to provide a structure to them. They Considered the relation between the exploration of new possibilities and the exploitation of old certainties in the context of organizational learning They postulate exploitation to be an extension of existing competencies, technologies, and paradigms. Its returns are positive, proximate, and predictable. Exploration is experimentation with new alternatives. Hence their returns are

uncertain, distant, and often negative or uncertain. exploration and exploitation compete for scarce resources, and organizations make an explicit and implicit choice between the two. For improved organizational performance and strengthening competitive advantage learning, analysis, imitation, regeneration, and technological change are major factors. This involved adaptation and a delicate trade-off between exploration and exploitation. This study can be considered as one of the fundamental studies that structure exploitation and exploration activities. The actions required to be conducted to perform the proposed activities are not clear or not sufficiently elaborated. A similar study (Siren et al., 2012), was performed. They propose strategic learning as mediating construct between opportunity-seeking (exploration) and advantage-seeking (exploitation) strategies and profit performance. They proposed that the Intra organizational elements of strategic learning would enable the dissemination, interpretation, and implementation of strategic knowledge which will make firms further benefit from exploration and exploitation strategies. Their study results conclude that for both opportunity-seeking and advantage-seeking activities, managers should invest in developing structures, processes, and practices that foster strategic learning. The study was limited to software industry segment in Finland, the generalization to other industry type will require more specific enquiries pertinent to that industry type.

Pre-existence of opportunities is always assumed. The creation of opportunities is less discussed among the scholars, One particular study by (Alvarez et al., 2013) talks about the creation of opportunities and they try to present some systematic actions to perform activities. They presented a theory for entrepreneurial action in the context of discovery

theory and the creation theory of opportunities. They postulated that the effectiveness of a wide variety of entrepreneurial actions depends upon the context discovery or creation. According to the authors, most entrepreneurial actions are to explore or exploit the pre-existing and identified opportunity, there are limited actions that would result in creating opportunities, and research in the context is also limited. Further, they argue that considering creation and discovery theory coherently in a strategic entrepreneurship context would have an implication on resources the organization develops in pursuing these activities together, this will also induce heterogeneity in resources and capabilities which can enable some firms to conceive of and implement strategies that generate sustained competitive advantage. The creation theory of opportunities is elaborated, but the practical implementable process of creation is not much discussed. The creative element of creation and its methodological aspect of application is not discussed in this study.

Fundamentally the structural nature of exploration and exploitation is different, many firms struggle to prioritize these activities. It is still relatively unclear regarding the timing of the activities required to be performed. (Raisch et al., 2009) Presented studies for simultaneous exploration and exploitation in the Organizational Ambidexterity context. They explored fundamental tensions related to organizational ambidexterity, including differentiation versus integration, individual versus organizational, static versus dynamic, and internal versus external. According to the authors, ambidexterity depends on the ability to integrate internal and external knowledge bases, further the ability to integrate external knowledge relies on a combination of external brokerage and internal absorptive capacity,

and ambidexterity may be supported by social networks. They provided future avenues for research in the ambidexterity area.

Firms engaged in entrepreneur activities have structure and process in place to enable exploitation and exploration of opportunities. We try to analyze according to the available literature references which factors play a role in improving the efficiency of exploration and exploitation activities. (Benitez et al., 2018) Information technology and IT infrastructure play a vital role in the identification of opportunities. (Vasilchenko and Morrish, 2011) presented a case study and evidence proving that established and newly formed social networks aid in collaborative cooperation which can be instrumental in exploring international opportunities. Apart from internal sources and capabilities, the role of external enablers or sources in opportunity exploration and exploitation is also required to be analyzed. (Davidsson, 2015) Argued that the theoretical and empirical progress has been limited on the aspect of the role of opportunities and their interactions with external actors, this they observe to be primarily due to the individual venture view. They proposed reconceptualization of opportunity in the entrepreneur context which encompasses external enablers, new venture ideas, and opportunity confidence which would make a clear distinction between the actor and the entity acted upon; between external conditions and subjective perceptions, and between the contents and the favorability of the entity acted upon. One similar study, (Foss et al., 2013) Examined the role of external knowledge sources in exploiting strategic opportunities and the influence of organizational design on these sources for exploiting. Through their study, they observe that as firms' reliance on external knowledge sources increases, they exploit more strategic opportunities. Further,

they observe the necessity of the right organizational design to absorb knowledge from external sources when innovating or exploiting opportunities. They characterize the right organization to be the one that is decentralized and has high coordination between internal and external sources. Their study was limited to Danish firms. There is no explanation or it's unclear about the nature, frequency, and extent of collaboration or coordination required with external sources for exploitation.

Business models have a profound effect on how firms create value. It is vital to understand the business model that is effective to utilize Strategic management construct. (Kringelum and Gjerding, 2018) In a paper present a novel conceptualization of business model innovation as a process that bridges the exploration and exploitation of business opportunities using organizational integration across value networks. They analyzed the process of integrating stakeholders in business model innovation and reconfigured models to enable collaboration. Further, they Prescribe how the threshold capability of structural and contextual ambidexterity can be turned into a dynamic capability by utilizing inter-organizational ties to develop domain ambidexterity. Ambidextrous organizations are firms with dual structures facilitating the simultaneous management of exploration and exploitation. This particular research was limited to logistic intermediaries, it is limited to exploration and exploitation activities business model innovation with the context of strategic entrepreneurship is not considered

SMEs undertaking exploration and exploitation activities would be able to develop more innovative products. To understand the process of exploration and exploitation leading to innovation in SMEs (Matejun, 2018) Presented empirical research carried out

in the form of a case study conducted among 5 innovative SME companies in Poland focusing on the creation, development, and commercialization of innovative solutions with at least at a national range. They studied how these companies perceive opportunity, how they associate the opportunity with innovation, and finally how these companies explore and exploit the opportunities. They found that the perception of the opportunity is in coherence with the management literature, but they remark that the perception and definition of opportunity are incomplete. Further, they conclude that experience determines the process of exploration and exploitation, the process is iterative and depends upon organization resources, creativity, proper screening and evaluation of ideas, organization learning and implementation of innovation. This research was limited by a very small number of industries considered. Secondly, the cognitive inference drawn were based on the perception of individual contributors who were experts in their technological domains.

From a purely academic perspective (Short et al 2010) conducted a detailed review of insights about opportunity and its processes with context to entrepreneurship research. They observed that entrepreneurship literature could be enhanced by relevant research in other fields, including accounting, anthropology, economics, finance, organizational behavior, human resource management, marketing, operations management, political science, psychology, sociology, and strategic management. They proposed ideas for collaborative work in developing ideas that leverage insights into opportunities offered within other fields. They elaborated on the prospect of future opportunities identified in other fields and having relevance to entrepreneurship.

2.5. Summary of the literature review and limitations observed.

Many authors tried to define strategic entrepreneurship and its constructs. But we can more clearly observe that the meaning, construct and definition, and dimension of SE are still evolving. The wealth generation, superior performance, ability to tackle complex dynamic business environments, and uncertainty of the SE construct remain unchallenged or undisputed. There is a coherent view on the ability of SE although its dimensions and elements may not be yet considered to be definite or complete. Finally, we can summarize strategic entrepreneurship to be containing the elements listed in table 1. The key elements of strategic entrepreneurship are taken from the various literature presented.

Strategic Entrepreneurship	<p>Constituents and Elements</p> <p>External networks and alliances, resources and organizational learning, innovation, internationalization.</p> <p>entrepreneurial mindset, entrepreneurial leadership, entrepreneurial culture</p> <p>human capital, social capital, organizational learning, creative cognition.</p> <p>collaborative innovation, network,</p> <p>strategic renewal, sustained regeneration, domain redefinition, organizational rejuvenation, business model reconstruction, Complexity science,</p> <p>dynamic capability, resource management, vision, growth, flexibility, contextual organizational dexterity, top management vision, iterative learning, Knowledge spillover, spill in.</p> <p>strategic flexibility, strategic adaptation, dynamic flexibility, the complexity-variety, dynamic adaptation</p>
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Table 1 Strategic Entrepreneurship Elements

Following Limitations in the literature review can be observed.

- A. Numerous studies performed are in developed countries. There are few studies in the African continent, but no major study appears to be conducted in developing countries (BRICS). The Indian Startup sector had seen high growth in the last couple of years yet there are no studies or reviews presented related to Indian SMEs, organizations, and companies with respect to the strategic entrepreneurship concept. The business environment in developing countries and especially in India is fundamentally different than that of developed or western countries. The business environment in India is characterized by political and economic uncertainties, volatility in markets, and complexity and ambiguity (VUCA). The degree of agility and resilience needed in firms in India is much more than that of the developed nations. Thus, the strategic and entrepreneur orientations that firms need to adapt to in developed countries are different. The current SE models will have to account for and be reframed for developed countries.
- B. The studies are seen to be generalized, the basic assumption being their applicability to all industry types. Complex nature or organization of the manufacturing sector where organizations or firms engage in the design and manufacturing of products, especially in developing countries compete and operate in a less favorable business environment. The current model of strategic entrepreneurship does provide some framework for them, but it needs to be

broadened to account for the challenges and difficulties SMEs in the manufacturing sector face.

- C. In the Manufacturing sector, entrepreneurial and strategic orientation depends upon the manufacturing systems employed and dynamics of logistics (supplier to industry and industry to retailer or customer). The recent disruption in the supply chain due to the covid 19 pandemic and the Russia-Ukraine war has proved detrimental to firms' long-term and short-term strategies. The current SE Constructs do not comment on such dynamics or disruptions. Advance manufacturing and Innovation in the supply chain stays poorly integrated into the construct.
- D. Simultaneous exploration and exploitation which form a major part of strategic entrepreneurship remain theoretically defined. The practical implementable methods, tools, and processes remain ill-defined or there is no sufficient clarity from the application aspect. How would firms access, test and validate the opportunities for simultaneous exploration and exploitation? Which part of the organizational structure or hierarchy will be involved when and where? These pertinent questions are still not clearly or sufficiently answered. While contextual ambidexterity is mentioned but its ways of applying are not sufficiently elaborated.
- E. Creativity is an important construct of strategic entrepreneurship. There are no methods or process defined to apply creativity in SE context. Although there are few references made to creativity, no concrete integrative links are mentioned in

any of the research. Creativity can be applied in various elements of SE like business model generation, product or service idea for the identified opportunity, Collaborative exploration of opportunities, and finally integration IT tools like business analytics, social media, and networks. Recent concepts like design thinking which can influence strategy remain outside the scope of the Current model of strategic entrepreneurship.

- F. SE as a construct for established firms is well defined. But for startups where the promoters are in the process of developing a firm, to exploit an identified opportunity there remains an unclear framework. The effect of integrating SE in the earlier stages of firm formation rather than the later stages remains unresearched. SE for such firms should provide tools and methods to navigate the VUCA business environment, sustain the strategic advantage and generate sustainable value.

CHAPTER III:
METHODOLOGY

3.1 Methodology

The research has two parts:

Part 1

In part 1, Systematic literature review will be conducted. Specific topics on which exploratory and systematic review is performed are mentioned below in detail. The extant literature will be analyzed to identify how these various topic manifest in business activity and how they are linked to performance. Review will identify managerial actions recommended in literature; methods to implement the proposed concepts in actual business environment and decision-making tools provided in context to business management.

Based on the literature review provide argument for contextual application of the mentioned topics to strategic entrepreneurship and further propose an integrative framework SE adaptation and implementation. The specific topics considered are as follows:

Creativity

- Design Thinking for new product and idea generation (Opportunity identification and exploitation)
- Organization creativity and employe creativity (Improve core competitiveness in innovation and in ability to provide novel solutions)

Dynamic Capabilities for strategic entrepreneurship

- Dynamic Capability in Strategic Entrepreneurship Context Development of dynamic capability for SMEs in Manufacturing Sector
- Business model regeneration
- Strategic foresight

Digitization and Advance manufacturing and value chain management

- Advance manufacturing for Systems and digitization of business process. Flexible manufacturing systems, adaptable and configurable manufacturing methods, and processes.
- Value chain management

Part 2:

Is to explore the current prevailing management practices and outlook of Indian manufacturing firms with respect to strategic entrepreneurship. In depth Interviews of managers involved in strategy formulation and execution will be conducted. Manufacturing firms involved in either providing manufacturing as a service or manufacturing a product will be considered. Primarily Small and medium enterprises will be considered.

Broadly Interview will focus upon exploring and identifying how following aspects of strategic management are adapted or considered within the existing strategy of the firms.

Actions or systems manifesting the following activities will be observed.

- 13. Exploitation and exploration:** Activities and actions the firm directly performs for identifying opportunities and for exploring new avenues of revenue stream or firm positioning against the market forces.
- 14. Strategic Resource Management:** Activities firms perform to develop capabilities from competitive ness perspective. How organization learning is adapted. Strategic weightage for competence and capabilities development in different streams of business and orientation of resources developed for simultaneous use of exploitation and exploring of opportunities.
- 15. Entrepreneurial Culture and Leadership:** Experimenting and Risk-taking capabilities. Broader vision and encouragement for innovation. Strategic weightage for Entrepreneurial orientation. Methods adopted to promote creativity, continuous innovation, and flexibility.
- 16. Network and alliances:** Strategic collaborations, alliances, and partnerships with external firms within same geography and different geographic locations (international)
- 17. Value chain management:** Explorative strategies adapted to develop and nurture the supplier base for the critical components or process.

CHAPTER IV:

A NEW CONCEPTUAL FRAMEWORK FOR STRATEGIC ENTREPRENEURSHIP

4.1. Introduction

Strategic entrepreneurship constructs capture major foundational aspects of a firm through which a firm can gain a sustainable competitive advantage, and sustainable superior returns compared to competition. Strategic entrepreneurship captures most of the aspects of wealth creation mechanisms by the firm. Strategic entrepreneurship is essentially simultaneous opportunity identification and exploitation, firms failing to identify opportunities will face challenges in maintaining competitive advantage and firms failing to exploit the identified opportunities will struggle to get superior financial returns.

The founders of the concept of strategic entrepreneurship (Hitt et al., 2011; R Duane Ireland et al., 2003; R.Duane Ireland et al., 2003) argue that the external networks, resources and organizational learning, innovation, internationalization, entrepreneurship culture, mindset, and leadership are the core foundational aspects of strategic entrepreneurship.

Strategic Entrepreneurship				
External Networks	Resources and Organizational Learning	Innovation	Internationalization	Entrepreneurial mindset, culture, and Leadership

Figure 1 *Strategic Entrepreneurship as classically proposed.*

The essential foundations of Strategic entrepreneurship can be briefly explained as follows.

4.1.1. External networks

Networks are patterned relationships between individuals and groups. Networks can be considered in many forms, such as strategic alliances, joint ventures, licensing arrangements, subcontracting, joint R&D projects, and joint marketing activities. The network can be linked to the competitive success achieved by large established companies. In big corporations, it is observed that competitors sometimes join forces to work on high-risk capital-intensive projects. India Tata Motors partnered with Fiat for passenger vehicle engines and even sold cars through the same dealers. Networking enables firms to access resources they need but do not possess, networking may provide a host of advantages such as faster market penetration, sharing of financial risk, increased production efficiencies, enhancements of innovation capability, and access to know-how. A network can help firms develop good reputations and establish legitimacy.

SMEs will be strengthened if they network strategically to share competence, risk, and markets. They will be able to provide formidable competition for bigger firms. Networking can be in the form consortium. Networking will also produce data from varied sources at different locations and process points. This data can be scanned for valuable information which SME can further exploit. Networks will help create wealth for smaller firms and at the same time help make firms competitive for a longer time.

4.1.2. Resources and organizational learning

Organizational learning is the generation of new knowledge that will influence and impact organizational behavior and create wealth (Hitt et al., 2001). Organizational learning is a firm's capability and is essential for innovation. Many researchers consider organization learning as a foundational element for innovation. Building capabilities takes time. Capabilities and learning occur over a period. Learning should be dispersed within the organization. Experimenting, research, and development activities are continuously carried out by firms. Many resources comprising of time and money are spent on experiments and R&D activities. Learnings from such activities should be recorded and diffused within the organization. Through continuous learning, firms develop new knowledge which can be a source of competitive advantage. The innovation ability of the firm is enhanced as the new knowledge and knowledge bank of the organization increases. This makes it possible for organizations to build and develop new products and services and thus places organizations in a position to create sustainable wealth or superior returns. The development of competent resources through organizational learning and following systematic organizational learning practices will help firms generate superior outcomes.

4.1.3. Innovation

Innovation from a strategic entrepreneurship context can be considered as an invention and commercialization of that invention. The strategic entrepreneurship construct postulates the wealth generation capability of the firm is directly proportional to its capability to innovate. Innovation, whether radical or incremental, positions a firm radically in a competitive position to gain superior returns. For innovation to manifest the

firm's organizational structure and culture should support innovation proclivities in employees and managers. Innovation should be the critical component of strategy. Research and development divisions are the primary centers where the invention or the development of new products or services occurs. Yet many organizations consider research and development centers as product enhancement centers rather than considering them as research centers. Smaller firms are uniquely focused on performing research activities and commercializing novel ideas. India has radically seen new startups commercializing novel products in the last five years. The leadership team should thus encourage, motivate, and incentivize innovation in organizations. More core research should be encouraged.

4.1.4. Internationalization

Sources of innovation and novelty are now spread across geographies. Availability of competence at a competitive cost is also spread across geographies. The world is getting smaller as connectivity among businesses and people increases within different countries. Being present in multiple countries or markets helps a firm to maintain certain average cash flow and produce respectable profit margins. If there is a slowdown in one market, there can be a boom in other markets. Firms can make use of different competencies available in different markets. Strategic alliances, acquisitions, and special licensing can provide firms with access to markets different from their home market.

Internationalization is an important element for Indian manufacturing SMEs. India has the largest reserves of metals like steel, aluminum, copper, etc. India is now the fastest-growing market for automobile and automobile components. The potential market size and a growing market exist. To rapidly gain a larger share of this market leveraging

technologies and competence from developed countries is essential. Bigger Indian OEMs have already made strategic alliances with global OEMs in many sectors. SMEs should explore these possibilities to collaborate or seek special or strategic licensing arrangements for the core technologies from successful firms of similar size or from bigger MNCs in foreign countries. The cost of manufacturing is lower in India so the manufacturing of components as a service for bigger firms in developed countries also remains a viable business proposition for Indian SMEs to Global SMEs.

4.1.5. Entrepreneurial mindset culture and entrepreneurial leadership.

An entrepreneurial mindset can be defined as a growth-oriented perspective through which individuals promote flexibility, creativity, continuous innovation, and renewal (R Duane Ireland et al., 2003). Entrepreneurially minded leaders and managers can identify and exploit new opportunities. Their cognitive abilities enable them to impart meaning to ambiguous and fragmented situations (Alvarez and Barney, 2007). Entrepreneurial mindset is required to practice strategic entrepreneurship. entrepreneurial mindset can be described by its key components which are entrepreneurial opportunities, entrepreneurial alertness, real options, and an entrepreneurial framework (R Duane Ireland et al., 2003). Entrepreneurial opportunities are the ability of managers and leaders to find wealth-creating opportunities. Entrepreneurial alertness is the ability of business leaders to identify when new goods or services become feasible or when existing goods or services become unexpectedly valuable to consumers. Entrepreneurial framework consists of a set of actions such as setting goals, establishing an opportunity register, and determining the

timing associated with launching the strategy required to exploit an entrepreneurial opportunity.

Leadership influences the success of firms. Effective leadership qualities are important, and they affect the overall performance of firms, especially of SMEs. Entrepreneurial leadership is the ability to influence others to manage resources strategically to emphasize both opportunity-seeking and advantage-seeking behaviors (Covin and Slevin, 1989; Hitt et al., 2001). Entrepreneur leadership exhibits six characteristics. Entrepreneur leaders nourish entrepreneurial capability, protect innovations threatening the current business model, make sense of opportunities, question the dominant logic, revisit the deceptively simple questions, and effectively link entrepreneurship and strategic management.

An entrepreneurial mindset along with entrepreneurial leadership will place firms in a positive position to generate superior returns and garner sustained competitive advantage.

4.2. Strategic entrepreneurship augmented with dynamic capabilities, creativity and digitalization.

The core elements of strategic management do not consider the dynamic nature of the present-day business environment. SE does not provide the necessary robustness in its management principles to defend or sustain in a VUCA (volatile, uncertain, complex, and ambiguous) environment. SE constructs are robust enough to provide superior outcomes in relatively stable business environments.

Innovation, although identified as an important element for business success, is difficult to achieve, a successful innovation that results in business success is a rarity.

SMEs and small businesses in the manufacturing sector have fewer resources to be strategic and entrepreneurial simultaneously. In India, the managerial and entrepreneurial mindset is restricted to driving operational efficiency and achieving a cost advantage. More recently, as is the case worldwide, the rapid technological growth and dispersion of technology have made many small manufacturing firms redundant, and many are under cost pressure putting further challenging conditions on gaining viable profitability.

Strategic entrepreneurship at the foundational level is a construct for wealth generation for organizations and firms by simultaneously enabling a firm to identify and exploit opportunities. A review of academic literature supports the concept of simultaneous identification and exploitation for sustained profitability by maintaining a competitive edge over the competition.

Strategic Entrepreneurship									
External Networks	Resources and Organizational Learning	Innovation	Internationalization	Entrepreneurial mindset, culture, and Leadership	Creativity	Dynamic Capabilities		Digitization in Manufacturing	
					Employee Creativity	Organizational Creativity	Strategic Foresight	Business model Innovation	Advance Manufacturing

Figure 2 Strategic Entrepreneurship proposed in this thesis.

The literature and proposed theories are limited in a practical sense that it does not elaborate much upon practices processes and methods to achieve simultaneous opportunity identification and exploitation. Further, the business environment is highly dynamic due to the evolving technology in the manufacturing sector. This can be explained by the electric vehicles business segment. While there is no counterargument for the need for electric vehicles. Fossil fuels are dangerous for the environment and depleting rapidly as consumption is increasing day by day. The fact that electric vehicles are the pragmatic solution for future mobility has driven the interest of many companies worldwide and in India and indeed many startups are observed in this segment. However, the profitability and business viability of the electric vehicles business in India currently is questionable. The two-wheeler segment is observing declined sales, and electric four-wheelers are yet to gain meaningful sales traction. The timing of turnaround remains unpredictable. Due to these factors manufacturers in the electric vehicle segment are under tremendous pressure economically. Similar in the energy sector and especially in renewable energy, wind and solar, the future of business is less predictable. Theoretically, the prospectus remains positive in the long run but there is no structural economic support and evidence for business viability in the shorter run. The ecosystem and business environment, if analyzed and considered in accordance with the routine business practices, there is no definite solution to the problems faced. In conclusion, there are a fair number of challenges for the manufacturing segment, which cannot be solved with routine or less rigorous management practices.

Due to the recent geopolitical tensions and socio-economic changes in India, there remains a drive to manufacture locally. The government of India has a production-linked incentive scheme for the manufacturing of critical electronic parts in India. Defense-related equipment production is also on the positive side. Increasing spending power and higher aspirations of the so-called middle class are driving the consumption and demand of consumer durable sky high. In conclusion, there are opportunities hidden in the current social, economic, and cultural environment in India. Demands fluctuate but remain dominantly in an upward trend. This proves the potential of the market in India for manufactured goods and services.

Strategic entrepreneurship construct thus needs to be expanded and strengthened to enable SMEs to navigate dynamic and VUCA (Volatile, uncertain, complex, ambiguous) business environments. It also needs to strengthen with philosophical and practical constructs develop resilience to competition by way orchestrating superior strategies.

In the current research thesis, the following three verticals or concepts are proposed to be considered within the strategic entrepreneurship construct. Along with the existing construct four new constructs are creativity, dynamic capabilities, digitization. In creativity there two sub verticals design thinking a construct to develop innovative products and employee with organization creativity to improve on core innovation development competence is considered. In dynamic capabilities two subvertical are considered strategic foresight and business model regeneration. Digitalization comprises of two sub verticals advance manufacturing and value chain management digitally. This addition of new element will expand the ambit of the SE framework.

4.2.1. Creativity

Innovation has been identified as one of the cornerstones of superior performance of firms. Innovative products and services have been found not only to provide a competitive advantage for firms but also to provide firms with radical economic performance. Creativity is a precursor to innovation. In any organization, managers and employees are at the heart of creativity and innovation. Organizational culture and structure should support creativity (Oldham and Cummings, 1996). Thus, for creativity to manifest which fuels innovation management should be creative and foster and drive creativity through the organization. Management should recruit creative individuals and managers and empower them with the requisite processes and practices.

The manufacturing sector majorly relies on domain experts and technicians to drive innovation and efficiency. Inherent high capital costs in fixed assets and the traditional cultural inertia (In management style) make it difficult for manufacturing firms to exhibit creativity. Management for creativity is thus challenging. Motivation for performance for creative people is different than motivation required for technicians. Differences in personality traits and the functioning of creative people and creative people are different than those of domain experts and technicians. For example, accountants are seldom considered to be creative. For innovation to happen creative people with domain knowledge and a team of such people should be recruited or at least consulted. The management methods, organization structure and culture for creative people to perform effectively should be meticulously formulated.

Management for creativity is challenging and has many differentiators than managing domain experts or technicians within the context of manufacturing. Creativity in management within the context of Strategic entrepreneurship is considered in this thesis. Works of T Amabile in the field of creativity is considered as the foundational aspects of creativity application. Creativity in management will help in gaining a competitive advantage by driving efficiency and gaining customer satisfaction. Creativity will also help in the identification of new business opportunities and further fueling innovation for exploiting the identified opportunities. For creativity to manifest it is important to recruit creative people with domain knowledge. Through the literature review, important traits of creative people are identified and listed. This information and knowledge will help managers to identify and manage creative people within the organization structure. The literature review is also performed to identify organizational creativity to understand the creativity of groups. Important factors that influence creativity in organizations are listed. This information will help the manager to manage creativity.

4.2.2. Design thinking as a construct of creativity in SE framework.

The application of creativity to management practices to organize and operate an organization will drive efficiency in the organization. Creativity is a vital element of customer satisfaction. While the creativity aspect for efficiency is considered but creativity aspect to produce or generate a business idea is very tangible. Creativity when systematically applied to understanding customer problems and translating these problems into a business idea, product, or service will be very desirable. One such method employed is design thinking. Design thinking is essentially emphasizing the end user, defining, and

redefining the problem, generating possibilities and ideas, prototyping ideas, and testing with the actual users. One of the distinctive features of design thinking is the notion of problem discovery. That is often time it takes a skilled and creative outlook to see problems that are not visible. These problems are not quite articulated by customers and are invisible to the customer as well. Design thinking methodology has the potential to discover such problems, translate such problems into prototypes, test the solution or prototype with real users gain feedback, and refine to produce a more acceptable solution. Small SMEs in manufacturing must practice design thinking to create the so-called blue oceans. They should have the structure in place to practice such a construct. Design thinking will be more effective if the drivers of such practices are creative people or if it is considered as a creative construct. The members participating will of course be experts and technicians from various domains, but the drivers should be creative individuals or creativity-related teams. Design thinking is thus a powerful tool for systematically identification of business opportunities in the form of a product or a service and further systematically exploiting this opportunity by developing relevant solutions. Design thinking thus is considered within creativity vertical and foundation element of new augmented SE framework.

4.2.3. Dynamic Capabilities

Every organization has a set of inherent capabilities to perform its functions. These capabilities along with their resources formulate the competence of the organization. These capabilities and resources according to the resource-based view are not uniformly distributed among the firms within the industry structure and the heterogeneity in the spread of resources is the source of competitive advantage. Dynamic capabilities are

essentially the extension of the resource-based view. Dynamic capabilities are the capability of the firm in sensing seizing and reconfiguring itself in response to the changes to the business environment.

The business routines, practices and structures are often time established in more static business environments. That is when markets, competition, supply networks, technology, and other legal policy frameworks are stable. When the business faces uncertainty or the market changes many of the SME, firms and businesses are unable to react to these changes. The Capability of the firm to sense the changes early, Seize the opportunities while managing threats and reconfigure itself to exploit the opportunities is vital for gaining superior returns and gaining a competitive advantage. Thus, Dynamic capabilities are very much relevant in the context of strategic entrepreneurship, their construct and theories when considered with the strategic entrepreneurship framework will add to the value-generating capability of the firm.

4.2.4. Business model innovation

To further strengthen reconfiguration and seizing capability the ability of the firm to reinvent its business model is essential. Business model innovation can be a principal source of differentiation and competitive advantage (Brown, 2008). In developing countries, the domestic market does not for majority of the products and services that provide the necessary profit margins and many firms operating at lower or near zero competition are the norm. Input cost is observed to be increasing, and in general, the business environment is overburdened with excessive competition (Many Red Oceans). Business model regeneration in manufacturing is challenging, costly, and time-consuming.

For SMEs in the manufacturing sector, it is further challenging due to the resource constraints. Compared to big corporations and multinational organizations it is still relatively easy for SMEs to be flexible in their business model. However, the competence to capture value and profits after the value is generated and delivered is required to be increased. Business models that provide superior returns are required to be generated. Business model innovation is thus considered within the dynamic capabilities construct in the context of Strategic entrepreneurship. Through extensive literature review an effort to identify how firms perform business model innovation. The various methods, procedures and theories that are proposed in literature are identified and elaborated. The objective is to identify the main parameters, theories, and concepts that influence modern business models and consider this construct with a Strategic management framework under dynamic capability vertical.

4.2.5. Strategic foresight

Uncertainty poses significant challenges for SMEs and any organization, small or big. Dynamic environments make it difficult to deploy traditional methods for planning. Forecasting is difficult as the visibility of the future is quite low. Companies struggle to have a comprehensive strategy to accommodate the uncertainties. The very foundation of dynamic capabilities for the firm is the capabilities of the firm to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. Dynamic capabilities are the capacities of the firm to sense, seize, and react to opportunities and threats (Teece, 2007; Teece et al., 1997), In this context, recent research highlights the crucial role of strategic foresight. Strategic foresight is the ability to create and maintain a

high-quality, coherent, and functional forward view and to use the insights arising in organizationally useful ways. in promoting dynamic capabilities (Slaughter, 2002, 1997) (Rhisiart et al., 2015; Rohrbeck and Schwarz, 2013; Vecchio, 2015) The practice of strategic foresight will help organizations to produce effective responses to uncertainty and changes, it will help organizations gain a competitive advantage by providing first mover advantage and the practicing organization will have a superior strategy. Systematic methods described and widely used are elaborated in this thesis. Tools that are used for the systematic application of the strategic foresight concept are also elaborated.

4.2.6. Digitization in manufacturing

VUCA business environments have a profound impact on the vital business parameters of SMEs, especially SMEs in manufacturing sectors. This is because fundamentally manufacturing sectors unlike consumer goods sectors are low-velocity sectors and have inherent rigidities in their assets. Manufacturing sectors have investments in fixed assets in the form of manufacturing machines and tooling which are tuned for products of a particular specification. There is limited flexibility. There is limited flexibility in changing the composition of the product and manufacturing method. For example, a metal component in the product cannot be changed to a composite or polymer type without causing changes in the manufacturing method. The know-how of manufacturing methods for metals is different from the know-how of manufacturing composites. Thus, having re-configurability or the ability to re-configure competence in advance manufacturing is important. Advance manufacturing methods provide flexibility in manufacturing process and improve ability to produce wider range of products or component within the same

setup. Managers and leaders should be aware of such digital or advance manufacturing systems and should have competence in selecting appropriate system. Such decisions will be strategic in nature and thus this topic is considered within SE construct.

4.2.7. Value Chain management

All the activities that are performed within the firm's business and professional boundaries are planned, executed, monitored, and controlled by the firm's managers. The primary objective of the activities that a firm performs is to gain superior returns for the investments incurred for the various activities. With modern firms functioning as a part of the constellation of various industrial firms with varied capabilities it is necessary to have a mechanism in place to exercise a managerial outlook over the activities performed outside of the firm's boundaries. Value chain management is a construct of management that provides the necessary continuity across firm's boundaries. When the supply chain is considered as a part of the value chain and the value is digitalized, the management is much easier. The data and information generated is superior. This data at the disposal of the management team can be detrimental for quality decision making process. Value chain management in this thesis is considered in context with SE at the value chain management provides tools and techniques to gain competitive advantage over rivals.

CHAPTER V:
CREATIVITY

5.1. Introduction to creativity from SE Context for opportunity identification and exploitation.

Opportunity identification and exploitation is one of the main pillars for Strategic entrepreneurship. Opportunity identification and exploitation are functions of innovation and innovation stands on a strong pillar of creativity. Creativity plays an important role in innovation which leads to entrepreneurship and competitiveness of firms. Creativity in general is a precursor to innovation. Innovation when exploited can be considered as entrepreneurship. Creativity as fuel to innovation is well-accepted among engineering and technical divisions but creativity as business skill and or application of creativity to various business process and functions will provide distinct benefits for example creativity in strategy formation can help induce agility and competitiveness. Creativity and creative skills remain widely exploited by engineers and technicians to innovate new products and services. Creative skills in business levels decision making can greatly benefit entrepreneurs and SMEs.

Creativity is widely studied in psychology from scientific and philosophical contexts. In management literature creativity has been consistently quoted to be one of the central pillars for innovation. Creativity in management has already been reviewed and studied extensively. Creativity is found to be one of the paramount traits required for the individual working in context of research and development, engineering design and individuals involved in development of products or services. Management traditionally focuses on

research and development or on technical divisions to garner creativity. Considering the current dynamic and competitive business environment, creativity skills can be applied to more broader business functions and are now one of the essential and valuable skill sets the firms managers and top leadership should possess to gain superior outcomes (Bourguignon, 2006). The aspect of creativity to augment firms' ability to innovate, take radical and innovative management decisions, deploy innovative business models, deploy technology and resources effectively to produce superior returns provide a strong basis to consider creativity and creativity skills within the ambit of Strategic entrepreneurship. From SE perspective application of creativity in different business domains to acquire positive outcomes or superior outcomes is essential and further creativity can be an important factor in developing competitive advantage and hence influence superior economic outcomes (Gorgoglione and Garavelli, 2006).

To understand the creative skills required and application of creativity to various functions of business it is essential to understand the definition of creativity from management and strategic entrepreneurship perspective. From the extant literature survey, the definition of creativity is observed to be evolving. While there are no contradictions on the very structure of definition that is there is no divergence of the established definition, it is observed that the factors and contexts that need to be included in definition seem to be widely debated. For the current research topic creativity is considered from a management perspective and considered more practical than theoretical. Since the objective is more modern in outlook for the current research topic and definitions cited or quoted in peer reviewed papers from the 2000 are studied and from strategic entrepreneurship context

definition provided by Gorgogline and Garvelli is most relevant. Creativity is recombining existing information from diverse sources and organizing and extracting new information and knowledge into new useful patterns. Creativity find connections between information and knowledge in a novel way (Gorgoglione and Garavelli, 2006). The definition is relevant because from a management perspective it is important to understand that creativity is required for a novel and useful outcome. Further creativity can help organizations and firms to come up with novel solutions in the current dynamic environment, with scarce strategic resources. Information and data are now readily or more ubiquitously available or can be sourced and the only important challenge is to convert the available information and data into meaningful resources to extract value out of it and creativity is the main trait through which organization and firms can do this effectively.

Creativity skills benefits are largely well documented positively in literature and its application in management in developing economies remains well applied and utilized in practice and a general observation in developing countries and particularly in India the concept of creativity from business and management context is not well appreciated and hence not well applied. Most creative companies with novel products and solutions are from developed nations. Developed nations such north America and Europe are where novel products, business models, business idea and services are observed to originating. It can also be observed that most companies that are accepted to be disrupters or who have shaped new markets and have dominated competitions are the companies who are the most innovative companies. These companies have reaped superior financial returns and made an impact not only on their local markets but across various geographies and markets,

overcoming all the cultural, protectionist and other competitive barriers. Innovative companies are creative companies. Creativity thus has a direct impact on generating and sustaining superior financial returns for a longer period. In the current chapter creativity from extant literature is studied how it is applied from business perspective, how creativity skills and individuals are identified, integrated, and effectuated in business process and functions and finally organizational creativity that team level creativity is studied.

5.2. Introduction to Creativity from SE Context for firms improved

Competitiveness.

The positive role of creativity in fueling innovation remains unchallenged. But the role of creativity in gaining competitive advantage through strategic decisions for gaining superior position against competition is not exploited to its full extent. Creativity in strategies will lead the firms to gain superior positioning against the competitive forces.

The current business environment in almost all sectors in India [and around the world including the developed economies] is characterized by severe competition which are driving profitability downwards. Creative strategies will provide formidable defense against competition by providing superior positioning.

Creativity is useful in any competitive environment and context for gaining competitive advantage. To understand the role of creativity objectively in gaining competitive advantage we can investigate how creativity in sports and more specifically in professional level sports is utilized. Great parallels from creativity in sports and creativity in business can be drawn. Creativity in sports is known as tactical creativity for gaining positions of advantage during play. Most creative players and creative teams have superior

outcomes. In fact, in sports creativity is applied in training sportspersons to develop certain traits (competitive) against formidable competitors either to defend or to launch offensive moves for more favorable outcomes. In modern day professional sports creativity has been increasingly practiced in training, developing tactics, coaching and in analyzing competitors. creative players are most sought out players, for example Brazilian players in soccer and Jamaican players in cricket. Similarly in wars and conflicts creative use of information gained and the means implemented to get information such as spying has profound application of creativity. In a business environment where competition is fierce and firms strive for gaining market leadership or to maintain market share, creativity in strategy formation and implementation [Marketing strategy, operational strategy, advertisement strategy or product strategy] like tactical creativity in sports would positively improve firms' competitiveness and its ability to achieve financial and strategic objectives compared to its competition.

Manufacturing competitiveness of SMEs and MSMEs will greatly increase if creativity is practiced and inculcated in its business environment. Creativity in manufacturing will affect the cost-effective production of products and services. manufacturing firms utilize human resources, raw material, and machinery to generate a product or a service for economic gain. Thus, it is essential to have creative people and creative machinery for creative output. Application of creativity in manufacturing to aid product creativity that is to bring novel products to the market, products which provide cost effective solutions will generate sustainable profitability in the longer term. In India and other developing countries, the input cost of resources required to generate a product, or

service is observed to be increasing. Creativity in utilization of resources creativity to improve productivity and efficiency can have a positive effect on profitability. Further creativity in the generation of information and data regarding various aspects of business, market and competition will help effective decision making for competitiveness. Creativity in manufacturing can be considered as one of the important skills set that developed countries like India needs to develop. MSMEs and SMEs need to concentrate more on creative skills building in their human resources and developing conducive work environment to boost creativity. Indian manufacturing sector lags China in competence World complete index ranks India 37th and China 17th in 2022. Indian manufacturing lags China in experience and capabilities. China comparatively has higher acceptability as manufacturing destination for western multinationals than India and hence remains a preferred destination for production outside the host countries for many of the MNCs. With this existing scenario Indian manufacturing sector is pitched against a formidable competitor with far more favorable business parameter on its side. It is now paramount for Indian Manufacturing SMEs and MSMEs to be creative. Investing in creativity and hence innovation accelerates the learning process and builds dynamic capabilities to produce and manufacturing products and services with worldwide outreach.

Creativity, as discussed and argued, is important for innovation and for competitiveness of a firm. It is now required to understand how creativity can be induced and practiced in a business environment. There is ample research on creativity from a psychological perspective. Creativity has been extensively studied and researched from

academic perspectives in the field of arts and advertisement. Research also exists on pedagogue methods for creativity training.

A manufacturing organization or any business consists of a constellation of people, machinery, and professional processes where these three vital elements coherently produce economic value for the investors and solutions for the customer. To be creative, it is vital to have creative people, creative machinery, and a creative professional setting. So, it is important to understand what a creative individual is, how creativity is manifested during the work process in individuals, how creativity can be motivated among employees and leadership teams. Manufacturing firms normally have rigid hierarchies, structures, stringent standard processes, and methods and sometimes tend to be bureaucratic due to the complex interactions among varied competence level of personnel involved. In these settings there is inherent hesitation and disinclination for the personals to exhibit creativity and for leadership teams to motivate creativity for fear of breaking away from set defined norms.

Managers and entrepreneurs should be able to identify and recruit creative individuals, encourage creativity at workplace, encourage and motivate dormant creativity in employees and finally should be able to create a work environment conducive to practice creativity within the business process and context. Leaders should be able to foster, coach and facilitate creative performance.

The objective of this chapter of creativity in research is to identify the extant literature on organization creativity. From literature the following information will be collected and presented

1. Creativity in Individuals: Understanding the behaviors patterns of creative individuals and identifying personality traits statistically more distributed in creative individuals as identified by scientific research.
2. Team creativity: The work environment required for creativity, factors affecting the team creativity and leadership behaviors for organization creativity. Motivating and boosting creativity in organizations and leadership traits to improve employee creativity.

The study of creativity process is from a business perspective. A business process in which creativity is adopted, encouraged, and practiced should lead to creative output. Creative outputs may be ideas for efficiency, product, service, productivity, data collection and organization. Thus, this study is limited and will not indulge in psychological, artistic, or educational aspects the context is business aspects (innovation enabling aspect)

5.3. Creativity in individuals

Creativity influences the quality of ideas and the idea generation process. Creative individuals or creative employees are best qualified for producing quality ideas. Employees with creative personalities or traits along with domain specific knowledge and skills are better placed for innovative outcomes. It is important to identify or recruit creative people. Creative people and their traits as identified through scientific research are presented.

(Jirásek and Sudzina, 2020) Performed and exploratory research within Denmark on Danish students to more deeply understand the relationship of creativity with personality features, through their literature review they identified five main essential traits as described by Zhao and Siebart (Zhao and Seibert, 2006, p.261). The five traits provided

are neuroticism, openness, conscientiousness, agreeableness, and extraversion. Neuroticism represents the ability of differences in individual ability in adjusting and stabilizing emotions. Openness to experience a personality dimension characterizes intellectual curiosity and tendency to experience and explore new and novel ideas. Conscientiousness is a measure of the degree an individual organizes, persists, works hard, and keeps himself motivated to accomplish a set goal. Agreeableness is a personal orientation characterized by a high degree of trust, forgiving, caring altruism, and gullibility. Extraversion trait is the extent to which people can be assertive, dominant, energetic, active, talkative, and enthusiastic.

A detail study by Irina Surkova (SURKOVA, 2012) presents an extensive framework of creativity. In their framework they performed a detailed literature review to identify the attributes or the personality traits of a creative person. It is worthwhile noting that they state that for a creative person to reach a creative outcome depends upon a worthy goal and the stimulus, motivation, or resistance that person experiences before achieving that goal. This implies that a worthy goal is required for stimulating creativity in individuals. The motivation and worthy goal along with the barriers or resistance to that goal provides creative person the required stimulus to workout required abilities and skills to achieve the goal. Hence their study finds it difficult to completely characterize a creative person and find the relation between personality features and creativity. Through their study they identified some of the traits which are casually related to creativity.

Similar study (Slesinski, 1991) claims creative persons have certain traits and these traits can be developed for performance. Some of the identified traits identified and

mentioned in their study for creative individuals are traits like self-awareness of their creativity, which is they identify themselves to be creative, they can come up with ideas quickly, they have flexibility in their thinking styles. Creative people are emotional and intuitive. Creative people can see things differently, they keenly observe, they are self-motivated, and they value intrinsic satisfaction over material rewards. Creative people love diverse knowledge and gather information and have risk taking tendency and can show resilience to criticism.

Table 2 Personality traits as per Surkova for creativity

<p>Summary of creative person traits (SURKOVA, 2012)</p>	<ul style="list-style-type: none"> -motivation, or intellectual initiative, or drive. - imagination, fantasy; intuition. creative perception; - knowledge of the field; divergent thinking; analogical thinking; metaphorical thinking; logic; concentration; making guesses; predicting outcomes. - analysis; synthesis; evaluation; conceptual framework; visualizing; - seeing problems; sensing gaps or difficulties in information, missing elements; idea generation. - transformation; combination; collection. - openness or naiveté; ability to regress; emotional expressiveness; risk-taking; non-conforming; curiosity; self-discipline; introversion; androgyny; persistence; resilience; self-efficacy; volition or will. - tolerance of ambiguity; preference for complexity. - humor, storytelling articulateness
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The performance of the creative person or the functioning of the creative person as an employee or as a member of a team is also required to be understood. Normally, Intelligent employee or intelligent workforce is desire of every organization. But does

intelligence convert into creativity? Due to the natural tendency of the managers to be inclined towards intelligence it is required to evaluate the correlation between intelligence and creativity. (Batey and Furnham, 2006) examined the relation between intelligence, personality, and creativity and their literature review indicates no concrete relation between intelligence, personality, and creativity. They observe the failure of scholars to converge on definition of creativity, personality, intelligence which leads to difficulty in establishing a concrete relation between them. Their observation on personality traits identifies creativity traits to be domain specific, important personality traits they observed are that creative people are confident or dominant, they prefer autonomy or independence and are inclined towards openness to new ideas and experiences. For research and development functions where most individuals are of scientific inclination and where more creativity is warranted, literature review revealed one study of interest. (Feist, 1998) studied comparative traits of scientists Vs non-scientists, more creative versus less creative. Regardless of the domain, this study states that creative people are relatively autonomous, introverted, they are open to new experiences, norm-doubting, self-confident, self-accepting, driven, ambitious, dominant, hostile, and impulsive. Feist in his study observes that creative personalities very strongly exhibit openness, conscientiousness, self-acceptance, hostility, and impulsivity. Between scientists and nonscientists conscientiousness was a strong differentiating factor. Further they make an important observation that there is difference in personalities exhibited by artists and scientists with creative inclination and they observe that creative scientists are more aesthetically oriented, ambitious, confident, deviant, dominant, expressive, flexible, intelligent, and open to new

experiences than their less creative peers. Artists on the other hand are aggressive, cold, egocentric, impulsive, antisocial, creative, and tough-minded.

Creative person's traits are identified and remain well presented in literature. It is consistently observed, and most of the research converges on the conclusion that creativity can be trained and creative skills can be gained by training and practice. One research identified in which employee creativity is described elaborately. (Jain Ravindra and Jain, 2016) In their study observe that employee creativity includes three individual characteristics. The first one is personality traits and self-efficacy, the second one is cognitive characteristics, and the final one is motivational aspects. Along with individual characteristics their research observes that the organizational climate, in which employees perceive strong organizational support for creativity is equally important and hence organizations must strive to increase the stimulants and remove the obstacles and barriers to creativity to support individual creativity. Their framework proposes four organization creativity characteristics that are supervisory and leadership behavior, co-workers' behavior, job context and social network. The integrated framework is reproduced from their paper in figure 3

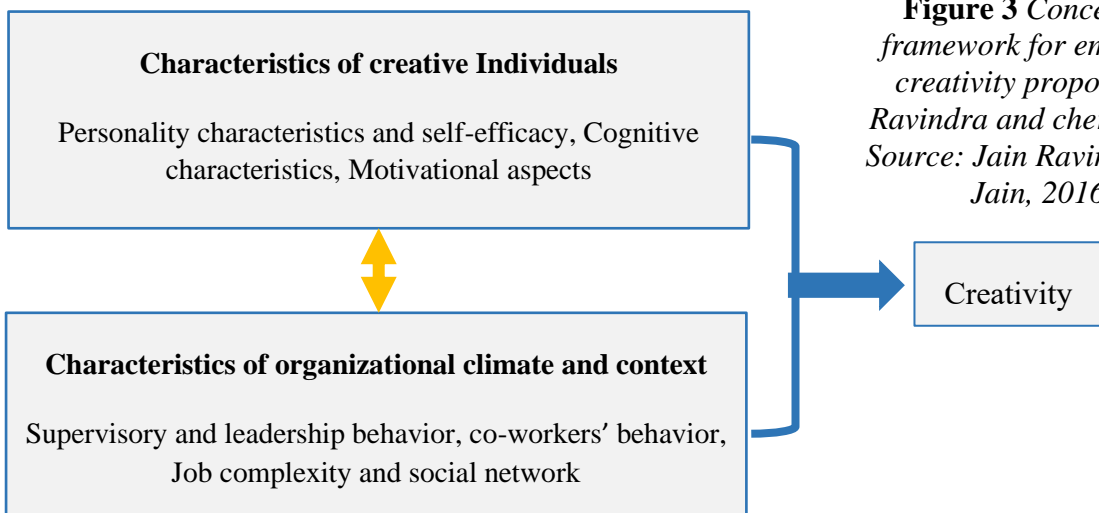


Figure 3 *Conceptual framework for employee creativity proposed by Ravindra and cherry Jain, Source: Jain Ravindra and Jain, 2016*

Creativity requires certain personal traits and to have a creative outcome creativity in the individuals needs to be provided with stimulus. Organization contains different functions of different domains such engineering, finance, sales and marketing, research, and development, business development. Each of these business functions requires a skillset specific to their domain to efficiently perform the routine tasks. Employees thus are of different core skill set in an organizational setup and they need to work in a team to perform business tasks. Organization setup and environment along with leadership and management team will play a crucial role in sustaining creativity among its employees. Leading creativity researchers such as Teresa m Amabile consistently in all her research papers emphasize the importance of social setting for creative outcome. Creative potential in individuals alone is not enough or a guarantee of a creative outcome(Amabile, 2017, 1997, 1983). A proper work environment, intrinsic motivation, goal setting and leadership plays an important role in extracting a creative outcome. Creativity herein is now analyzed and studied in business contexts and especially from SMEs in manufacturing firms.

According to (Woodman et al., 1993) Organizational creativity is an activity or more specifically set of activities performed for generating valuable and useful new products, service, idea, procedure, or process by a group of individuals working together in complex social setting. Modern organizations have many divisions with various functions operating coherently to achieve predefined organization objectives. These divisions have complex functional, personnel and economic interactions (i.e. with their own division Profit & Loss accounting). To analyze and understand the interactions and their influence on the work environment with context to creativity (Woodman et al., 1993)

proposed an interactionist model to explain individual creativity in organizational setting. In this model creativity is considered as a behavior in a complex situation. This model provides an integrative framework that combines important elements of personality, cognitive capability, and social psychology to explain the creative outcomes of creative individuals in organization. They suggest that creativity is a function of antecedent conditions, cognitive styles and abilities, personality, motivational factors, knowledge, and all these factors are influenced by social and contextual factors. Further they studied group creativity and found that group creativity is influenced by group composition, group characteristics and group process and contextual influences stemming from organization. A similar model to understand how creativity is manifested in organization multilevel analytical perspective was proposed by (Borghini, 2005; Drazin et al., 1999) In this model individual creativity is considered to be dependent upon multiple factors, factors such as previous conditions, skill and cognitive style (divergent thinking and flow of ideas) , motivation, relevant knowledge, personal elements (self-esteem, control) contextual influences (physical environment, tasks and time constraints) and social influences (benefits, social rewards, etc.). When every action promotes creativity innovation would manifest. Creativity can be exhibited when the organizational subsystem interacts in a constructive way. Constructive way leads to sense-making that is individuals in a team start to make sense of activities been performed, the ability of sense making is developed through the process of learning and unlearning. Temporary assimilation of cultures for a common objective also helps in abilities of sense making in team activities (Borghini, 2005).From the published literature it can be observed that an employee having an

appropriate creativity related characteristics when work on a complex challenging job under non-controlling and supportive supervision produces most creative work or output (Oldham and Cummings, 1996). Autonomy and encouragement are required to be provided for creative employees so as facilitate creative output, similar conclusion can be made of creative teams.

From Strategic Entrepreneurship context the aspects of creativity and organization creativity that will require a further evaluation are as follows:

- A. Organization (Work) environment
- B. Leadership for Employee Creativity
- C. Empowerment of employees

5.4.1. Organization environment

From the reviewed literature it is well understood the requirement of an adequate and appropriate work environment for creativity to manifest. Academic studies observe that organizational environments can be created to foster and sustain creativity. The elements of the organization environment required to be orchestrated by management and leadership team are analyzed from literature review. Various models and explanation of organizational environment is reviewed.(Amabile, 1997) Leading researcher of creativity in her study with highly technology-oriented organization analyzed individual creativity in an organizational setting. She argues that fundamentally the work environment should foster and increase intrinsic motivation and support exploration of ideas. Her study led to the development of component models of creativity and the componential theory of

organizational creativity and innovation. These two theories can be explained by figure 4 and figure 5.

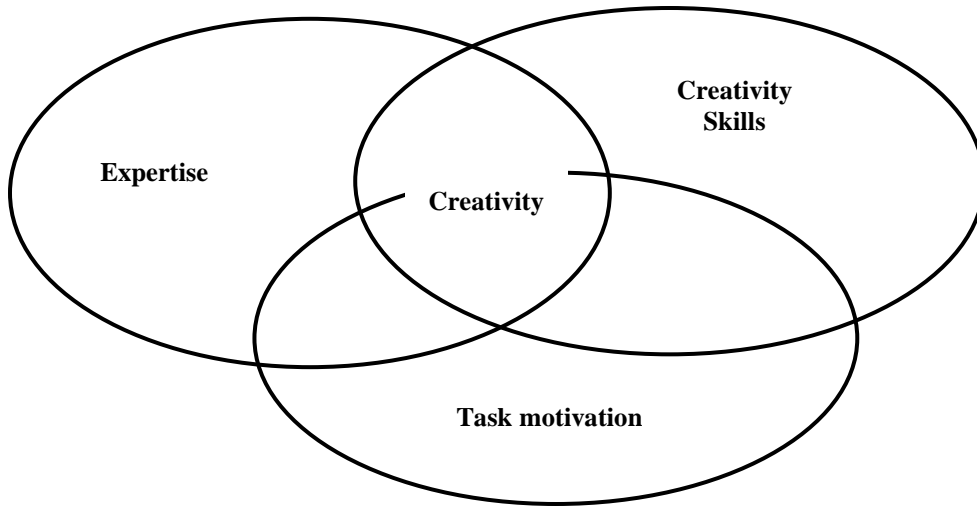


Figure 4 *Three Component of Creativity by Amabile*

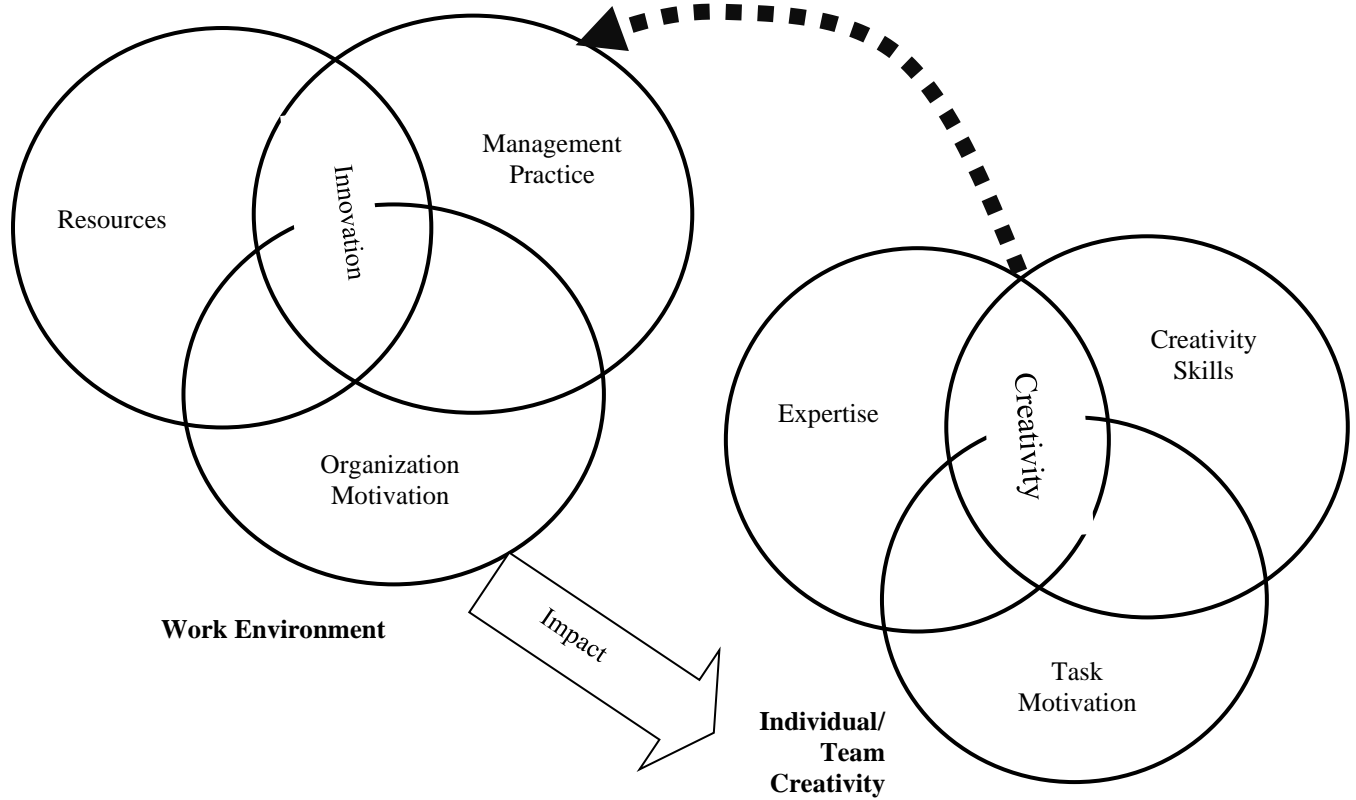


Figure 5 *Organizational work environment impact on individual creativity by T Amabile*

On the same topic on creativity an extensive study by Michele Rigolizzo and Teresa Amabile, which they published in their paper (Rigolizzo and Amabile, 2015) identified innovation to have four distinct process stages. They are problem identification, preparation which includes gathering essential information, idea generation and idea evaluation. Creative process requires certain learning and creative behaviors with respect to social environment conditions at each of these stages. Entrepreneurial projects require rapid learning ability to succeed in dynamic and complex business environments by developing novel and useful products, services, and business models. Learning and intrinsic motivation are thus the key fundamental aspects that the work environment should foster. Work environment should support the process for creativity. Work environment in essence should support autonomy, exploration of challenging and meaningful work.

Employee empowerment and leadership

According to management Guru, Peter Drucker adapting to dynamic changes requires employee initiative, creativity, and innovation. Accordingly, many companies have changed from traditional hierarchical management systems to empowered work team structures aimed at improving the overall efficiency and adaptability of organization. Employees who are empowered remain highly motivated to try new ways of doing things, experiment with diverse ways and processes to achieve their goals. They remain committed and persevere in the event of discouraging outcomes. They are more proactive and engage more in information gathering. Empowered teams can be considered as shared perception among team members regarding teams' collective level of empowerment. The empowerment of teams and employees is considered from creativity context, that is teams,

and individuals should be empowered to take creative decisions and adopt creative strategies in their pursuit for performance, efficiency, productivity, and competitiveness.

There are two perspectives that are found in literature related to employee empowerment. The social structural approach (Kanter 1977) and psychological approach (Spritzer 1995b). The Social structural approach empowers people for decision making, in this approach this is achieved by delegation of authority through structured set of policies and procedures. In this approach deliberate practices are followed, such practices consist of managerial practices which strongly encourage and facilitate information sharing, decentralize decision making and encourage employee's participation in decision making process. Extensive training and coaching are planned and provided to facilitate compliance with various organizational codes. These practices are further encouraged by appropriate rewards and compensation.

Psychological empowerment concentrates on releasing the potential within individuals. (Conger and Kanungo 1988) defined psychological empowerment as a strong feeling of self-efficacy through identification and removal of conditions that tend to foster powerlessness. This is done by organizational practices and informal techniques of providing efficacy information. (Spreitzer 1995b) considered psychological empowerment as a motivational construct. This construct is manifested in cognitions such as meaning which is a sense of feeling that one's work is important, competence, self-determination which is perception of freedom to choose and impact which represents the extent of degree one's views and behavior influences outcome.

Research has identified moderating factors for psychological empowerment. These factors are intrinsic motivation, creative requirement, work engagement and encouragement to innovate while mediating factors that are identified are Leader encouragement for creativity, trust in supervisor, supervisor supportiveness, team empowerment and team creativity,

Team level empowerment, which is a shared perception of collective empowerment, plays a greater role in creativity or innovation performance. Team empowerment should enhance team members' motivation for performing tasks. Ekvall (1996) Team empowerment climate includes elements such as challenge, freedom, support of ideas, trust and openness, vitality, and liveliness, funny and humorous, argument, conflict, risk preference, and time looseness which promotes more creative behaviors and effective innovations. Sufficient empowerment within a team brings a higher level of trust among team members which can aid more information sharing and can enhance autonomy and team accountability. Team empowerment enhances team learning, knowledge sharing and transactive memory which can be defined as shared cognition about the encoding, storing, and retrieving processes of information (Wegner, 1987, 1995).

Information empowers managers, articulates business constraints and opportunities to various levels of managers with provided managerial flexibility in decision making provides a conducive environment to foster creative output. Team creativity and individual creativity are important in any organization. Creative Teams and individuals should be identified and empowered to try new things and approach problems through out of box thinking. Business problems such as creating new applications for products, finding new

markets, and extending applications of products to varied industry domains require creative thinking. Creative thinking and creative output should be a professional mandate for managers in a competitive and dynamic business environment with a sufficient level of structural and psychological empowerment provided to managers.

5.4.2. Leadership aspects for creativity

Leadership plays an important role in extracting creative output from teams and organizations. The behaviors and styles that need to be adapted for leading and supervising creative teams for creative outputs must be different than the ones that are generally and naturally adapted. Generating creative output is a complex task in an organization setting, as different individuals collaborate and work together on common objectives. India in this context is different due to the diversity in its culture across the varied states with different languages social customs traditions and belief systems. Multinational companies working across different geographies and countries also have people from different social structural backgrounds. In modern day companies there are teams with members in different countries with different sets of beliefs and sometimes with a completely different work culture and organization culture. Leading such teams and cultivating and extracting creative output is challenging. These sections will explore the literature for the recommended leadership styles and behaviors for motivating and extracting creative output.

(Amabile and Khaire, 2008) Through the various interview conducted with the top leaders identified few roles for leaders for creativity. Leaders according to their research should encourage and enable collaboration, open the organization to diverse perspectives

and bring the process to bear carefully. Further they state the leaders should map the phases of creative work, manage the commercialization handoff, and provide paths to creative managers or people through the bureaucracy. Their research identifies the need for leaders to allow people to pursue their passions, embrace the certainty of failure, provide the setting where creative work can be conducted, to listen carefully and be an appreciative audience. Leaders should also provide intellectual challenge, fan the flames of motivation that is constantly keep motivating. These observations in their research are profound and impactful as these observations are primarily from top leaders of technology companies and innovation driven companies. Clearly a general observation indicates deliberate efforts and steps are required for creativity and innovation to manifest and for these to happen the leaders are cornerstone of the creativity and creative output in organization.

Leaders typically involve in controlling the work environment and facilitating collaboration between different individuals. Leaders have a strong influence on employees' motivations, affective states, cognitive processes, and the context they work under. Leaders can influence employees or teams' creative performance by demonstrating certain types of leadership style. Leaders need to have greater understanding of different leadership styles and theories, and they should be able to adopt a best fit or more effective style with creative individuals or teams. Literature has number of empirical studies which have tried to link leadership styles to boost creativity, leadership styles such as supportive leadership, empowerment leadership and transformational leadership are studied and documented widely. The various studies have not concretely established the process of how leadership affects creativity. To boost creativity and to generate creative output leaders should have

knowledge or understanding of the mechanism through which creativity is excited in individuals and teams. To decide over the leadership style the underlying mechanism that influences creativity is thus essentially required to be understood. Shuan Jae Shin in her study identifies Two broader categories for the mechanism, these mechanisms are interlinked with each other. Since leadership impacts organization at multiple levels. The individual level mechanism and multilevel mechanism are the two broader categories. At individual level motivation, affective and cognitive mechanisms are described. At the team level leadership influence on team processes and emergent states all of which effectually may relate to motivational, affective, and cognitive mechanisms (Ahearne et al., 2005). These chapters consider leadership influencing mechanism perspective. This mechanism perspective is elaborated figuratively in the picture shown in figure 8. The mechanisms are important to understand to identify leadership styles and behavior aspects for leaders to promote creativity and obtain creative outputs. It is also noted here that the empirical research on the various aspects of mechanisms is limited. There is no study that has produced evidence of various relationships of leadership styles and creativity. The mechanism perspective is an effort to understand theoretically the influencing conditions or behavior patterns for creativity.

Leading researcher T Amabile consistently articulates that motivational mechanism is considered to have two aspects intrinsic motivation and self-efficacy. Componential model of creativity created by T Amabile (Amabile, 1997) a widely respected model postulates that intrinsic task motivation is one of the most important factor for deciding creative performance. In Business environment, it is now implied that it would be

worthwhile to understand which leadership to adopt to influence employee's intrinsic motivation. According to literature specifically directed towards generating intrinsic motivation Management is encouraged to adopt supportive leadership, empowering leadership, and transformational leadership styles to have an impact or increase employees' level of intrinsic motivation. Supportive leaders or supportive style is also reported to play an important role in increasing intrinsic motivation. In supportive style leaders provide informative and positive performance feedback, Leaders with this style tend to increase the number of choices in their decision making (Oldham and Cummings, 1996). The Supervisors' tendency in SMEs is inclined towards exercise stringent control or supervise for top-down approach on activities and routines. Regarding controllability (Zhou and George, 2003) indicates that a controlling supervisor behavior which manifests in the form of close monitoring will have negative influence on employee creativity. Such behavior creates disinterest in employees which leads to robotic performance of activities with no sense of ownership. For creativity to improve in business operations at supervisor level it is recommended to have an informational supervisor behavior. This behavior includes providing developmental feedback to employees which will have been observed to have a positive impact and effectively influence employee creativity. In context with SMEs one dominant problem in operations is the absence of sense ownership among mid-level management. Literatures abundantly emphasize empowerment leadership that would lead to the development of ownership attitude among the employees. Empowering leadership is described in context of creativity as a leader whose behavior or directions to employees emphasizes and provides significance and meaning to the employee's job(ZHANG and

BARTOL, 2010). Empowering behavior exhibited by supervisors and managers will provide more autonomy and encourage employees to have self-efficacy. The final aspect of leadership is transformational leadership which greatly influences intrinsic motivation. The mechanism through which influences can be effectuated can be understood through four dimensions of transformational leadership. These four dimensions are inspirational motivation, idealized influence, intellectual stimulation, and individualized consideration (Shin and Zhou, 2003). All these four aspects of transformational leadership boost intrinsic motivation of employees. Literature mentioned one more important type of leadership style for creativity. A collaboration inclined Leader member exchange style of leadership influences self-efficacy. Employee self-efficacy further fuels or encourages creativity. For creativity to manifest employees are required to be motivated towards creative mindset. Efficacy belief is an important parameter in motivational mechanism for generating a creative mindset. The work environment climate should be conducive for creativity to blossom. Employees should feel and perceive a creative environment. High quality leader member exchange (LMX) improves employees' perception of climate for creativity and innovation. This perception can be further increased by and elaborated high expectations of leaders from employees (Scott and Bruce, 1995). This perception of climate for creativity increases the self-efficacy of employee. (Liao et al., 2010) In their study observed that high-quality LMX is likely to provide employees with positive expectations and will encourage them to undertake challenging tasks. Similarly (Tierney and Farmer, 2002) further found that supervisors support, role modelling and persuasive communication increases belief in one ability to produce creative outcomes which is self-

efficacy and in the relation between leadership and creativity self-efficacy beliefs is one of the main mechanisms. The other silent aspects but not thoroughly researched and documented leadership styles are authentic, shared, and benevolent leadership. These are styles which have potential to influence creativity.

5.4.3. Affective and cognitive mechanisms:

In an organization setting it is important to maintain a particular environment to cultivate creativity and keep motivation high. Several studies have illustrated that a positive work environment or positivity affect leads to better creative performance. Positive atmospheres improve employees' fluency, flexibility, and originality. Negativity such negative moods, decreases creativity and positive mood increases creativity. This implies that the employees affective state such as emotions and mood at the workplace have a profound effect on creativity (Amabile et al., 2004) Leaders should play important role in building up positive affective state for the employees. The negative effects such as fear and anxiety should be minimized. Leaders should be skilled in negating or minimizing the effects of negative events on employees' emotions at the workplace. Business leaders should take decisions and active steps to influence employee creativity. Business leaders can make this by helping employees affective states to be oriented toward creative behavior by creating requisite work atmosphere. Some studies (Atwater and Carmeli, 2009) have found that the high-level leader member exchange (LMX) provides fuel for energy that causes an affective state for creativity and creative output. Emotional intelligence is an important trait to be present in the business leaders to motivate employees and direct them to exhibit creative behavior. With high level of emotional intelligence (Zhou and George,

2003) business leaders can help employees to have better emotional experience. The emotional experience of employees influences their emotional state for affective creative output.

Creativity requires extensive and effortful cognitive processing (Amabile et al., 1996). Leaders can affect facilitate employees cognitive processing ability required for creativity. (Reiter-Palmon and Illies, 2004) In their study describes that leaders should provide access to diverse information, encourage team members to share information and ideas, create an environment for them to indulge in creative processes. Business leaders should proactively encourage employees to adopt and accept creative processes. The connection between leader behavior and creative process engagement was also highlighted in a study by (ZHANG and BARTOL, 2010) their study found positive influence of empowerment leadership to subordinates involvement and engagement in creative process. Empowerment also leads to psychological empowerment which further fuels creativity.

5.4.4. Multilevel nature of mechanism

Leadership influence manifests at multiple levels at individual, team level and organization level. A leader can formulate a work environment that will have simultaneous influences on teams emergent motivational states like team creative efficacy, team cognitive processes (influencing and motivating information and idea sharing) and team emotional states (e.g., team moods) (Kozlowski and Klein, 2000). These multilevel mechanisms have an influence not only on organizational or team creativity but also on individual creativity.

Leaders should foster organization culture and climate through affecting and developing work environment. The development of work environments conducive to creativity or simulating creativity can be done by leaders or they can influence such formation. Transformational leadership can influence climate for innovation through affecting teamwork processes like group cohesion, team communication and conflict management. This mechanism of influence at the team level is through the creation of conducive climate. Transformational leadership and facilitative leadership styles help in diverse teams, the influence is at multilevel by affecting team reflection which can be characterized as questioning, debating, planning, learning, analyzing, divertive exploration, making use of knowledge explicitly and viewing team overtime with new awareness.

5.4.5. Leadership and cultural influences on creativity

As globalization increases organizations often must operate with teams in different countries and regions with completely different sets of beliefs and customs than the host country where the leaders are located, and decisions are made. This is true for many research and development programs where many of the new developments and products are orchestrated. Moreover, considering from a strategic entrepreneurship point of view, the products might be developed and produced in multiple locations and sales of such products can be in different countries across various continents. There are multiple external connections, for example production of certain components can be in different countries than the country in which the component is designed. So, it's important to understand the cultural expectations to decide over the management style to be adopted. The mechanism

to trigger motivation by adopting a particular style may not be true in different countries for example (Jung and Avolio, 1999) found that students from a collectivistic culture generated more ideas with a transformational leader, whereas those from an individualistic culture generated more ideas with a transactional leader. They also observed that collectivists tended to have higher levels of loyalty and commitment to their leader, whereas individualists tended to put priority on personal rewards. Thus, the cultural context is an important context to understand which leadership style would effectively and efficiently influence creativity in organization and individual.

In Indian culture which can be characterized as risk averse culture, extremely intolerant to failure, diverse in religious belief and customs, diverse in language, diverse in social customs and diverse in entrepreneur practices leadership styles to adopt can be challenging and perplexing. The prevailing characteristic at the forefront inhibits creativity and makes it challenging to develop creativity fostering culture.

Development of culture that promotes creativity which indeed leads to identification of new product services or a revenue stream for an organization should be meticulously planned and inculcated. Transformational leadership can help develop a culture and empowerment can help maintain the creative culture. psychologically safety plays an important role in Indian employee's psyche, this must be provided through adopting to leadership mechanism which trigger intrinsic motivation and psychological empowerment. Different styles at different stages of development can also be adopted, for example during initial stages of team building for creative activity supportive, facilitative,

and benevolent leadership styles can be adopted and then at the execution stages empowerment and High-level leader membership exchange can be adopted.

Finally, it is important to understand that creative output is not guaranteed and hence methodological pursuit of a creative output leading to innovation that provides a novel economic revenue stream should be continues process. Leadership should embrace failure and negate the negative influence of failure on teams. Creativity cannot be managed but we can manage for creativity, creativity in not and elusive and intangible but can be managed (Amabile and Khaire, 2008).

Creativity is important in exploration and exploitation of opportunities and creativity in formulation of strategies or indeed dynamic strategies to gain an important market position to achieve superior returns. Leadership should appreciate and adopt the organizational aspects as demanded by creative team and individuals as the investment in the initial stages will lead to long-term superior returns.

5.2. Conclusion: Creativity in context with SE applied to manufacturing SMEs

Creativity must be manifested in organization big or small. It is not essential that the manifestation is in the form of a product or service for the new revenue stream. This would obviously be a desired outcome, but there are more possible exciting fruits of creativity in various forms within the organizational routines and process that can be reaped. The stereotype thinking that creativity can be only applied to art or artistic fields or in business creativity is only related to domains like marketing and research and development should be discarded. There is abundant literature as produced herein which profess application of

creativity at all levels and at all locations in an enterprise, and its application leads to a superior outcome.

Small firms with a manufacturing background need to realize the benefit of encouraging creativity in their business process. Managerial and leadership team needs to be open for practice and management of creativity. From literature reviews presented here an important pattern that emerges that can benefit SMEs and managerial implications can be summarized as follows.

- **Identification and recruitment of creative personnel:** Creative persons are required to be identified within the organization or deliberate recruitment of creatively inclined personnel needs to be considered strategically. Personality traits for identification of such personnel are listed in table 3.
- **Training and nurturing creativity:** It is consistently observed, and most of the research converges on the conclusion that creativity can be trained and creative skills can be gained by training and practice. Firms should motivate and tolerate practice of creativity and structured training for its practice should be provided.
- **Goal Setting:** From literature review it is observed that for a creative person to reach a creative outcome depends upon a worthy goal and the stimulus, motivation, or resistance that person experiences before achieving that goal. This implies that a worthy goal is required for stimulating creativity in individuals. Thus, Goal Setting to the identified group must be done strategically.
- **Motivation strategy:** Every manager and leader have some mechanism in the form of rewards and recognition or incentives in place. Motivational mechanisms for

creative people are required to be different. According to componential model of creativity developed by Teresa Amabile intrinsic motivation, which is internal interest of the person is the prime source of motivation for creative behavior or act. Managers should be aware of these facets of motivation and strategize their motivation mechanism accordingly.

- **Leadership style:** Literature advocates for “management of creativity”. Leaders are required to have a strategy for management of creativity or creative people and to foster the ecosystem where creativity thrives. Of the considered styles in Indian context transformational leadership can help develop a culture and empowerment can help maintain the creative culture. The Leaders and entrepreneurs require to have transformational leadership style in context with creativity.
- **Work environment:** Work environment should be designed to promote a culture of openness. Work environment should have openness for considering new ideas by workers and colleagues. A work culture should be developed that encourages learning both individual and team learning. Leaders should facilitate the required resources for learning and collaborating of specific tasks.
- **Routinized dedicated projects for creativity:** Organization leaders should identify and provide individuals with puzzling problems, challenges, and tasks that trigger their interests and passions. grouping of people to specific projects of interest and grouping a diverse set of people with an objective to have a creative output should be routine.

- **Development of Resources and Infrastructure:** Learning is an essential part, along with learning collaborating and inviting diverse views is an important element for creativity. SMEs should strategically invest in facilitating tools for collaboration and for recording the learning or activity outcomes. Incremental learning should be facilitated by record keeping tools and methods that are now widely available and at a very competitive cost. Apart from the tools required, the infrastructure should be in place to facilitate group meetings and gathering for meaningful discussions.

According to the available literature creativity in individuals and in organizations is dependent upon the social background of the participating individuals or group. In SMEs context the leadership team should be aware of the social and economic background of their team and core members. This is required to adopt a particular leadership style and motivational mechanism to fuel their intrinsic passion and interest towards organizational objectives. Experimentation and meaningful failures of experiments should be tolerated. Employee empowerment should be considered strategically.

In conclusion, for creativity to manifest in SMEs leadership team will have to take deliberate and well-planned steps or decisions to enact systems, structures and strategies mentioned in this section and develop an ecosystem for creativity within their enterprises.

CHAPTER VI:
CREATIVITY AND DESIGN THINKING

6.1. Introduction: Design thinking as creativity tool within strategic entrepreneurship

With increased globalization and socio-economic constraints it is more challenging to come up with new and innovative products, services, and business. The need to include creativity and design methods into the business process is increasing. It is increasingly difficult to identify new opportunities and exploit them before competitors exploit them. Gaining customer confidence and customer loyalty is further a big challenge. This is reflected in the high failure rates of new startups. High failure rate of new products and services that are been introduced in the market. Many new so-called innovations are poorly received or eventually withdrawn from market (Markham and Lee, 2013) High failure for new product introduction and perceived economic risk is indeed a major barrier for investment in research and development activities by small scale enterprises in India and in developing economies. One of the widely used tools or strategies for tackling the risk involved in new product launch is a stage gate process. For high value products and high technology intensive products, the stage gate process (SG) is followed for evaluation of ideas and products. The stage gate process follows a gating process, that is a strategical map is created, then the development process is broken down into stages and each stage has an evaluation gate. The progression of development is monitored and reviewed at the gates with respect to the strategic maps created (Cooper, 2008; van Oorschot and Smulders, 2010) The evaluation at each stages reduces the economic risk if the project is

analyzed to be not fulfilling the strategic and business objectives and further progression of project into other stages is stopped. As opposed to stage gate process design thinking is a powerful and proven tool to tackle complex problems. *Design thinking* effectively uses approaches and methodologies developed in the field of design for abductively creating nonroutine solutions to ill-defined problems, problems which are complex, ambiguous, and difficult for solution (Dorst, 2011).

Design thinking is known to employ a problem-solving approach. Design thinking deploys design tools, techniques, and design philosophy. The underlying assumption is that thinking like a design can transform the way the products and services are generated. Many organizations have created breakthrough ideas by deeper understanding of the consumer needs and using design principles to design solution for the end user needs and create customer value (Brown, 2008, 2008) Design thinking is essentially emphasizing with the end user, defining, and redefining the problem, generate possibilities and ideas, prototype ideas and test with the actual users. Design thinking and the tools provided in design thinking are very effective in understanding the problem of the end user. The ability to understand or deeper understand end user problem is one of the distinctive features of design thinking. Design thinking discovers the problem. The design thinking process assumes that the problem may need to be found since a wrong problem may have identified initially and hence design thinking starts in identifying a problem newly by revising searching process (Liedtka, 2015; Zheng, 2018) Design thinking emphasizes on both mindset and task. That is it philosophically places importance to mindset and mental model and way of thinking innovation and its practices and tools (Gruber et al., 2015; Leavy,

2010) abductive reasoning, or logic based on assertion of what might be or ought to be, is a chief feature of the design thinking process (Dunne and Dougherty, 2016) and it is human-centric as it places more importance to perspective of the end user or stakeholders.

With the definition and explanation provided in the literature design thinking can be considered a powerful tool to generate information regarding the customer need or market need before the competitor generates it. Opportunities can be identified from the information generated and relevant solutions can design and tested with actual users. Thus, this method provides a powerful tool to explore and exploit business opportunities in the market. There is no specific skill set or higher order abilities required to execute the design thinking process. The process makes use of inherent resources within the organization and the resources follow a structured methodology (guided and supervised) to synthesize the customer requirement and needs into business opportunity. This aspect of design thinking makes its application relevant to SE context.

6.2. Design thinking for development of strategy, its advantages and process

description.

Design thinking for product development is now a widely adapted method, but interestingly more recently there has been interest among researchers to use design thinking to formulate business strategies. In context of generating a business strategy it is reported to be increasingly used, and the benefits are well reported in literature. Business strategy development is done by team of leaders from various functions. There are multiple stakeholders sometimes with conflicting interest. Design thinking methodology can provide an effective collaborative tool for these stakeholders to arrive at mutually beneficial strategies.

(Cabral et al., 2019) in their paper argue that empathic understanding which is at the heart of user-based design is very relevant for every organizational stakeholder, including employees, distributors, suppliers, customers, and investors. Thus, the element of empathy creates cohesion among the participating stakeholders for each other. Further design thinking helps analyze the end user by putting interrogator in the shoes of each stakeholder and warrants the interrogator to think about the same questions of business values like user experience and this leads to actualization that characterizes user-based design thinking. Thus, Design thinking can be broadened to include business strategy within its purview as the thinking model provided by it is more inclusive and participatory model. To formulate business level problems design thinking can be used as a method through which strategies are formulated. The thinking process which designs thinking mandates will enable development of strategies that are more amenable and encompass all aspects of business functions. This is because this method will include key stakeholders and users, define various problems, and try to solve multiple perspectives. It will include ideation of possibilities with key stakeholders, the ideas will then be converted into prototype ideas and strategies or models which can be finally tested with all stakeholders and actual end users. This process, although complex and consisting of leadership efforts, is worth the outcome as it is successful in generating insights into the options available to an organization, and further proceeding to test the viability of the options available to the organization for achieving transformation. For such strategies SMEs are best suited due to their inherent flexibility and ability to experiment faster. Strategies developed through

design thinking can be tested faster and refined accordingly as the information evolves during testing phases.

Integration of design in an organization strategy and its strategic approach will enhance organization ability to drive innovation and competitiveness by effectively responding to emerging business challenges and practices (Brown, 2008). Problems and challenges faced by today's firms are increasingly complex and dynamic in nature due to this strategy formulation is a challenging task. Design thinking is an effective tool to tackle problems that are increasingly faced by SMEs leadership for strategy formulation. For successful formulation the concept of design must be integrated in strategy and organization as a practice and a way of thinking. Integration of design thinking will provide a competitive advantage and enhance firms' abilities to come up with original and novel solutions for products or services. Business managers of bigger MNCs are therefore now increasingly embracing such an emphatic way to understand the market environment and advance it to strategic management. In strategic management context design thinking can be considered to influence managerial abilities in three aspects thinking, structural and cultural. The first aspect which is thinking side of the design and is to understand how this will influence decision making of strategist. The second aspect is structural perspective. In structural perspective the leadership ability to provide direction in locating design thinking in the organization structure, ability to understand and consider the outside perspectives and elevate design to strategic level. The third aspect is the cultural aspect. In the culture aspect design thinking is used by managers to shape the organization culture, a culture which provides more attention to the process element of strategy generation. The three

important aspects identified explain the mechanism of how design thinking influences strategy conceptualization from cognition, structure, and process perspective.

SMEs leadership should identify various methods and ways to integrate or make routine practice of thinking methods for development of strategies. To integrate and motivate this kind of design thinking in organization (Björklund et al., 2020) provide four conditions or activities that are required to be developed. These four activities which are proposed to facilitate implementation and integration of design thinking start from development of strategic vision, development of facilities, development of cultural capital, and finally development of directives. The first necessary condition will be the development of strategic vision which elaborates the necessity to have vision of the future and appetite for growth. A vision to change and innovate to align with the future. Such a strategic vision developed must be clearly understood by all stakeholders. The second condition is to develop facilities. Adaption and promotion of design thinking practices will necessitate organization to allocate physical spaces and resources for design activities. The third condition is development of cultural capital ensuring the understanding of the individual risk, value of design and its practice. The fourth essential condition is the development of directives which ensures accountability for practicing design, KPIs that details design practice and role descriptors in the organization that reflect design practice. Such methods and processes are required to be adopted by leadership and managerial teams.

Similar study to effectively integrate of design practices into strategy development leading researchers Jeanne Liedtka and Saul Kaplan (Liedtka and Kaplan, 2019) suggests

expanding the conversation forum by involving interested individuals from managerial and design teams and then equipping them with listening and explaining skills. They propose to develop, build, and integrate basic design practices throughout organization and include design thinking in the core leadership training. While training is important, firms will need to proceed beyond training and encourage active use of the tools that are learned. From the leadership side it is suggested to allocate resources and decision-making autonomy and tolerate mistakes. To Start effective implementation, they recommend starting small with small projects and with nimble design champions.

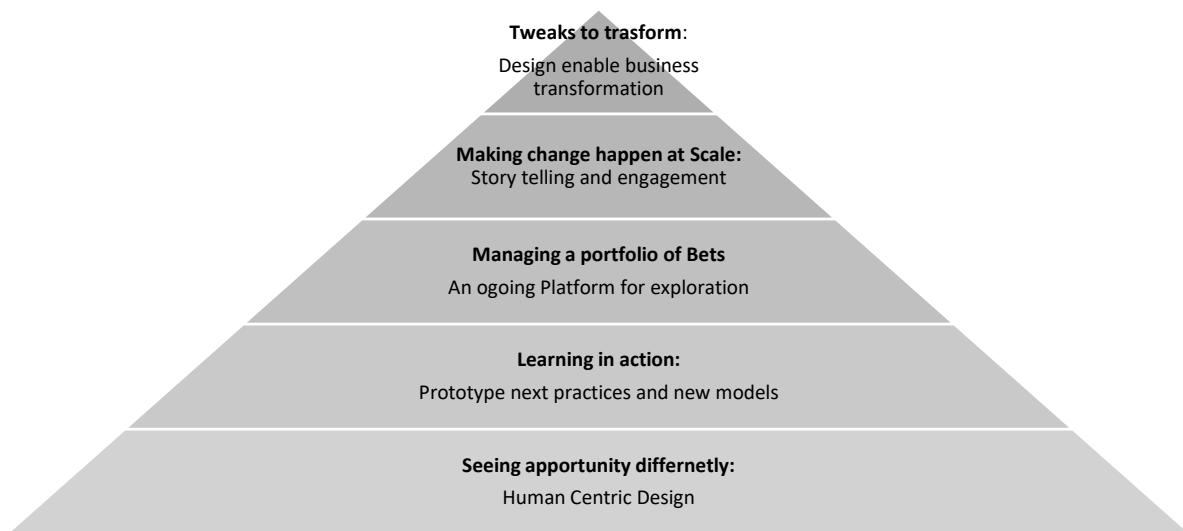


figure 6 Design Practices that improves strategy development (Source: Liedtka, J.,Kaplan, S. 2019)

(Knight et al., 2020a) Ethnographic observations find and conclude that design thinking not only generates discrete design process which mainly focus on understanding customers, but they encourage management towards a broader approach that help shape

the strategic outcomes. This is achieved when organizations enact the multimodal use of materials, and the shift between individual and collective practices are facilitated. The observed four distinct ways for generation of strategies these way as explained earlier are reviewing, simulating, conversing, and collaborating. Further they comment that design-led strategy allows managers to gather insights and deeper knowledge of their market environments. This is achieved because design thinking leads to observation and engagement that goes beyond what is possible within the boardroom. Through practice design led strategy formulation managers acquire insights on their decision from outside the firm. This can be considered as a type of feedback that can get incorporated into how firms and managers evaluate and change the organization's strategy to align to stakeholder's requirement.

Design thinking applied to generate strategy in actual industry.

From literature review one study is mentioned here to understand how design thinking process is implemented for strategy development in actual business environment. This study is published by (Knight et al., 2020b). During their research they worked together with strategy managers from a digital only bank who were involved in formulating a new product from customer data. The managers in the concerned firm were working with design thinking led content collected from customers. The task undertaken by the manager in this exercise was to understand the external view of the market and integrate this information into strategy making by generating routine activities and practices. In their work they observe that product-market fit which is required for superior performance is an important business dimension and needs to be solved perfectly. Such product market fit is

difficult to solve more specifically from an innovative context where organizations are forced to either re-imagine existing product and service or create a new offering. In the same study conducted by (Knight et al., 2020a) they further analyzed how design, product and strategist concepts were integrated in the final solution or outcome. The outcome of their analysis and observation is that their findings about how design thinking influences strategy making. Design thinking according to them influences strategy making through manipulation of two dimensions. One dimension they term “Dynamism and materials” and the other dimension they term as “engagement context”. In Dynamism of material dimension, they explain that design thinking generates a range of different material from personas to point of view problem statements and raw customer data and this information must be interpreted in context of strategic issues. To interpret the data in strategic issues context business managers, need to use the generated data in two separate and distinct fundamental ways statically and dynamically. These two methods (Static and dynamic) provide two different perspectives to visualize the data in two different ways. When the data and information is viewed from static, the data and content is treated independently of other visuals at hand and when viewed dynamically collation or combination of the available material is tried. These two ways of viewing data are deployed to gather different outcomes from two different time dependent processes. These two ways of viewing create different kinds of openness that direct the way managers and participants engage with design thinking content. The second dimension on the axis defined is “engagement context”. This context explains the nature or the ways in which the managers or the stakeholder will use the data for generating outcomes. Managers and stakeholders have

options to either engage with the design-thinking data individually or collectively. This technique then provides multiple paths for generations of ideas. The two dimensions of engagement context and dynamism of materials are reflected on two separate axes as shown in Figure 10.

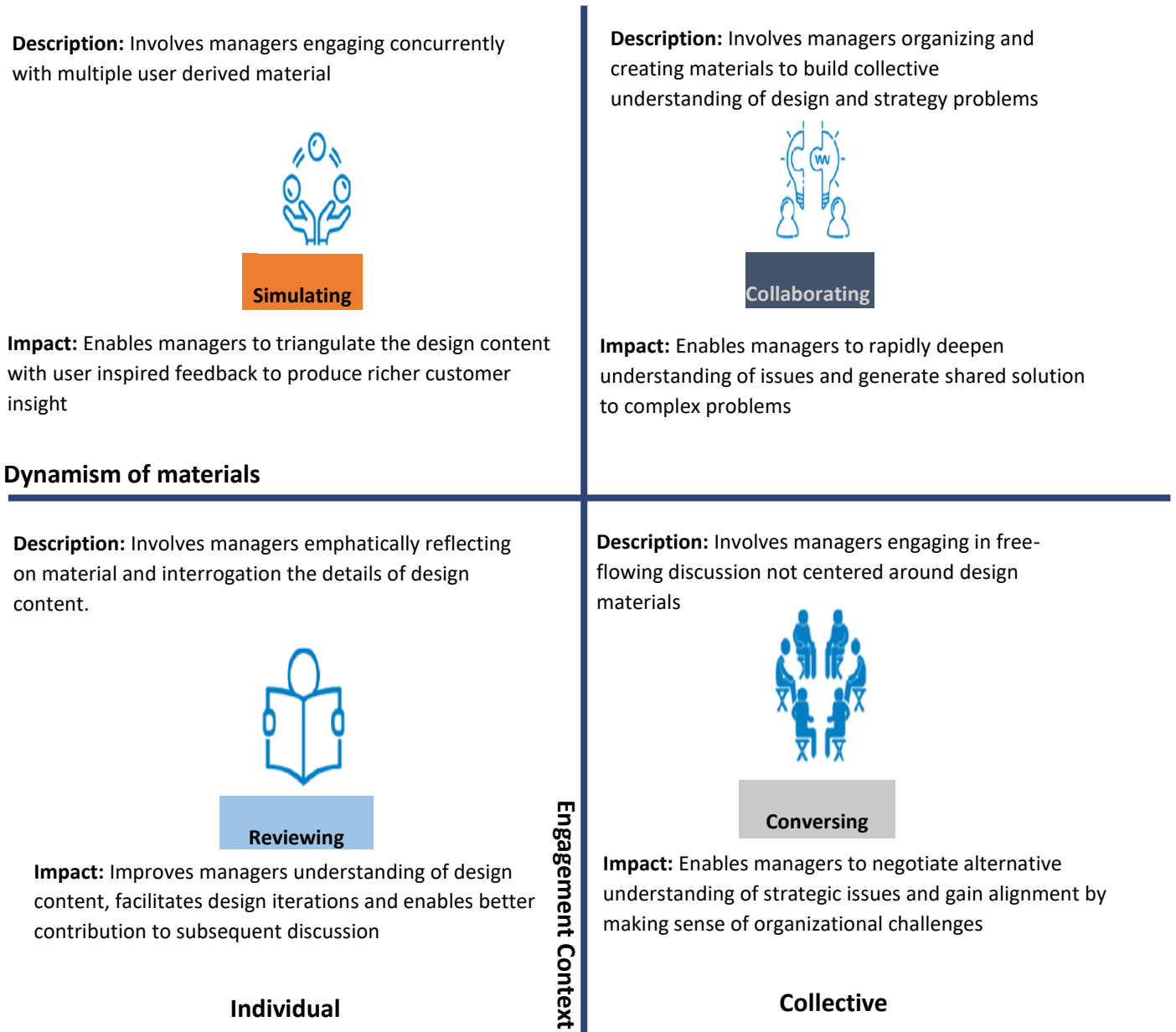


figure 7 Practices Of interaction with design think data , Influence of design thinking for strategy formulation
Source: (Knight et al., 2020a)

Design thinking reported benefits for strategy development.

Integration of design thinking into strategy formulation has scientific and practically observed benefits. The outcome is superior to any other method adopted. There are numerous advantages recorded in literature regarding the benefits of design thinking adopting a human centric method in strategy development. Jeanne Liedtka, leading practitioner of design thinking along with Saul Kaplan presented a study on design led practices with application to strategy. In their work (Liedtka and Kaplan, 2019) they identify five areas where design practices has influenced strategy practice and firms have benefited. These five areas where firm benefits are that firm start seeing opportunity, they learn in action and on actual tasks, they start to manage a portfolio of bets, they start making change happen and more important they are confident in transforming business model. To elaborate an explanation of success in adopting such strategies and their benefits, they explain that design practices help business and its leaders to see new opportunities when a human centric design is integrated in strategy. Human centric design facilitates problem solving approach by focusing on empathy, possibility, and iteration. It uses the experience of end users and their pain points. Human centric design broadens the scope and opportunity horizon by seeking the re-framing of the problem itself. Human centric design also maximizes the possibility of success by motivating people to look for alternate sources for new ideas and by encouraging co-creation. This process thus helps in achieving more diverse perspectives from all possible stakeholders. Such creative practice influences learning during prototyping and experimentation. This learning produces information. Design practice can produce novel insights by using prototyping and testing to refine

capabilities in delivery. Prototyping in design thinking is more rigorous compared to routine prototypes as it goes beyond building minimum viable product and proceeds to test the minimum viable business model for the developed ideas. It facilitates exploring and testing new models in the real world and provides designers with feedback on conceptual ideas from actual customer contact. Such practices will also help in managing the portfolio by focusing attention on new strategies and offerings as best.

SMEs leadership will benefit greatly if there are easy to use tools for decision making. There are various financial models that help manager navigate decision making related to financial aspects of the firm. From the strategic development aspect where managers must develop strategy for competition and for exploration or exploitation of business opportunity tools and techniques should be made available. Design thinking methodology is powerful in this regard as it offers many tools to managers. One example is it offers tools to managers to help create bring-build-buy maps that combine traditional supply chain logic with thinking about unmet customer needs. Managers will be able to develop potential value-risk grids arrayed as portfolio of bets along critical dimensions of uncertainty and this would facilitate their decision making and pay-off timelines. Co-creation and prototyping tools in design thinking help in engaging partners in exploring and iterations. Once the iterations or small-scale tests are successful scaling is all that is required to exploit identified opportunity. This innovative process fosters engagement with all stakeholders and alignment to make change happen on a scale. Commercializing those that pass the tests requires involving the rest of the organization in a change process. Such transformation necessitates creating an emotional connection to the new strategy, and

design thinking can foster potent engagement and focused alignment to accomplish this. Finally Design thinking and design practice will offer tools that help organizations to transform business models. Design thinking will help managers involved in strategy generation to imagine, design, prototype and commercialize entirely new business models.

For superior performance and financial returns, firms should have the ability to design and deploy disruptive strategy. The managerial skill sets that are required for generating human-centered incremental innovation are very similar to skill set for developing disruptive strategy. Capability sets developed by design thinking is managerial capability to focus on customers urgent needs, firms' ability to focus on improvement of ability to prototype and experiment, leadership's ability to manage a portfolio effectively, and strengthen stake holder engagement and alignment. Such capabilities thus generate effective strategies that provide successful growth under incremental or disruptive demands. Development of such capabilities and practices for firm strategy development will add value both incrementally and radically to the entire value chain. Incrementally by protecting and building on today's business model and radically by helping mitigate the threat of being disrupted.

6.3. Study conducted on SMEs using design thinking process and their impact.

In this section studies related to application of design thinking in actual SMEs is presented. The benefits and the impact they caused are reported and the mechanism through which the benefits manifest is also presented in this section.

Study by design council UK in SMEs in UK

(Ward et al., 2009) Key members of design Council, United Kingdom's national strategic body for design which is a government-funded design policy and promotion organization in 2004, as part of a UK Government's wider policy of using design to improve the competitiveness of UK firms had launched a program called designing demand with the aim of helping stimulate design-led innovation among the nation's SMEs. The Prime objective of the program was to provide transformational services that use design to drive strategic changes in SMEs by introducing experienced designers to smaller companies to mentor them through the process of commissioning and managing design. These design professionals did not do any resulting design work themselves, rather they helped the companies become better clients, promote investing in design and innovation strategically and its effective usage. This exercise provides extremely positive results. The Program essentially provided service in three broad categories, that is generate which is focusing on specific projects for SME with growth potential, second category was for hi-tech ventures helping their business to overcome technology and market challenges through multiple design projects. The last category was called immerse which was service for a larger business to help them tackle strategic challenges through multiple design projects. All these categories result in positive results on a broad spectrum of business dimensions including financial results. This is profound observation and conclusion as it directly links design thinking practice to positive outcomes to many of the business dimensions and it links design thinking to superior financial returns as the results generated showed positive improvement in revenue and profitability. For such a success to manifest key Member

Atonia Ward Elle Runice and Lesley Morris in the same paper (Ward et al., 2009) provide five key success areas which enabled the design associates help business in identifying and prioritizing challenges and further to map out opportunities and strategies for design led improvements and innovation. This was achieved by design associates closely working with top management and influencing business strategies at the core. The key five areas identified are vision and strategy, brand and identity, product and service, user experience and innovative culture. Their manifestation is explained as below:

- In the area of vision and strategy the authors observe that design thinking helped shape companies' vision and strategy, it helped in putting vision into strategy. Design thinking methodology utilizes visualization to help understand complex ideas and relationships by using sketches drawings and maps. These tools helped companies to articulate and communicate business ambitions through action and roadmaps effectively to all stakeholders and align all to a collective vision.
- Design thinking also provided matrices and tools to analyze risk and maps to analyze the relative position of stakeholders and customers.
- Design thinking augmented products and services by helping them to improve their products and services by adapting to holistic design philosophy and delivering better brand expression.
- Design thinking also helped in devising cheaper and better manufacturing processes, generating choices in new materials and efficient systems that benefit the environment.

- Design thinking encouraged managers to think widely about brand identity and helped them to perform wholesale reassessment of their brand and corporate identity. Further they observe that design thinking methodology help companies identify the core components of their brand and help them to articulate their “big idea,” values, vision, and personality. Design thinking helped in creating brand identity that closely meets customer needs and improves their perception about the quality of the company’s products and services.
- Design thinking considers all the assumptions underlying the business’ strategy and inspects them through a market- and user-focused lens. This interrogation from the user’s viewpoint often means the core business idea or assumed target market is subject to challenge. Design thinking effectively enforced user centric design, which considers every problem from the viewpoint of end user and repeatedly test assumption with real users in actual situation to generate products that are comfortable and intuitive to use. Thus, design thinking enhanced customer experience by putting them first and at the very core of the business strategy.
- The final key area of business which was observed to be influenced by design thinking is the culture or innovation culture. Design thinking approach engaged managers and teams with games and workshops and assigned team tasks and homework and encouraged often siloed departments to work together, this process observed that companies have metaphorically and physically broken-down walls between various departments. Innovation culture was much improved by improvising corporation as design thinking has enabled them to visualize their

strategy, have plastered their walls with product and service roadmaps, enabling all employees to see where the company is going and how their own contribution fits into that aim. Research work done by (Ward et al., 2009) is important as it actually provide insight of design experts working with SME in implementing design thinking for formulating strategy, product and services and explaining the positive results observed during the process.

Study in Europe in SMEs

A similar study was conducted in the UK was also conducted in Europe.(Borja de Mozota, 2002) conducted a research to create a model which would explain how design relates to strategy and innovation policy in SMEs , they performed this study using management research models. Research was conducted on 33 European SMEs selected in their respective countries for their excellence in the design of their products. Their research led them to link design with competitive advantage, and they were able to provide guidelines for managers to locate their design strategy as a part of design management strategy. They were able to generate guidelines for designing strategy that would effectively enable a firm in creating a differentiating positioning and creating a strategy for coordinating and transforming positioning. Their research identified three classes of firms that use design or design thinking to augment their value chain. Class one they describe as design for managerial competence in this class firms use design thinking to accelerate time to market, to improve cooperation between different agents and to design relationship change with suppliers. Firms in this class share innovation vision for management and strive to achieve a strategic orientation. Class two is described as design as a resource

competence in this class firms use design to improve coordination between marketing and production, create new market, develop care for customer in innovation, design core competence and design technology transfer this class is essentially market and client driven orientation. Class three types of firms are described as design as an economic competence, they use design thinking for positioning the firm to sell products at higher price by improving the perception of benefits felt by the customer. Essentially, they conclude that design thinking when integrated into strategy creates value at different levels of porter value chain. Firstly, value is created by optimizing the primary activities and design action on the consumer perceived value, secondly by optimizing the coordination among functions and the support activities of the firm and facilitates structure that transform the management process, thirdly by generating a new vision of the industry by optimizing external coordination of the firm and its environment.

Application of design thinking to high tech product development:

Design thinking is not limited in its application with less technology intensive products. Design thinking and its practice can be applied with firms with high technology intensive products are process. Many new concepts and ideas are evaluated in different manners. Most of the high-tech products and service companies rely on stage gate process for finalizing concepts and products. The stage gate process of evaluation of ideas is a process where there are series of review meetings with different stake holders and experts. The idea is evaluated at each state or review meeting with pre-determined parameters. In contrast with this widely adopted evaluation methodology Siemens's molecular imaging group incorporated design thinking principles in their research and development projects

with an objective to regain market leadership by replacing their traditional stage gate process (Appleyard et al., 2020). In their study to analyze and explain the design thinking application for high tech product R&D authors observe that the Siemens group intending to start entire product development afresh hired a new designer to implement design into the strategy for developing the new product. A new four-phase innovation process which placed more emphasis on the activities espoused by design thinking methodologies like careful user observation and needs for discovery, reframing of the observational data to get at the essence of the user problem, the determination of complete system-level design imperatives to address the user needs, and the interlacing of logic and intuition to craft solution was adapted. Adhering to the design thinking methodologies the team adopted new ways for innovation. By this change and adaptation of new practices such as design thinking and implementing its principle in product creation process, they realized that this process brings to them multiple possibilities or multiple streams of ideas. This was because the adopted methodology made it possible to discover and interpret customer value or value perceived and experienced by customer more effectively and pragmatically. From these various possibilities they were able to evaluate the one solution that provided maximum value or maximized the value to cost ratio. Before a full physical prototype was built, the team created a new approach to system concepting called leapfrog concepting. In this concept they would use a state-of-the-art platform as their starting point, and they would proceed to further create multiple new platforms and features that would boost value to cost ratio for the product. For high technology products there are always multiple features that can be provided. This feature may be new or untested. In the problem with

management is to when to start to include such features. In this exercise which Siemens performed they managed to hold a reserve in features that would raise value to cost ratio, but were not yet technically feasible, this led the team to develop a new dynamic capability called creative forbearance. Each of these new activities incorporated extensively design thinking principles and made use of the tools and techniques defined by it and the innovation team found these three areas (Creating universe of possibilities, leapfrogging and creative forbearance). Siemens team observed more benefits in developing and evaluating ideas and products by adopting the main tenets or principles of design thinking into their research and development (Appleyard et al., 2020).

6.4. Conclusion: Managerial implication for integrating Design thinking in

Manufacturing SMEs

Due to limited resources and financial constraints many SMEs cannot spend resources on experimentation or conducting trials for new products or processes. It is required that the experimentation should be limited or optimized. Experiments should be designed for maximum success probability. Exploration consists of experiments. Resources deployed for exploration should be strategically planned for the maximum probability of success. Finding exactly what market needs and what market is willing to pay is a challenging task one which design achieves creatively efficiently and economically. Integrating design or design thinking into organization improves organization capabilities for innovation and improves its competitiveness along with its capability to explore and exploit opportunities more effectively and economically. Design thinking capability to align different functions and facilitate constructive coordination and conversation over end user problems will have a

positive impact on organizational efficiency, functioning and operations, form smaller organization facilitating such forums would not be challenging, thus integrating design thinking into organizations and especially organizations in developed countries will provide positive economic benefits. The benefits of design thinking are evident and documented in literature and large organizations already have structures and teams in place to extract the benefits of design thinking. This structure can be and is possibly extended to SMEs or smaller firms as there is no specialized knowledge or skills required. The design thinking process exploits the capabilities already available.

The application of design thinking for development strategy is elaborately discussed in this chapter. SMEs managers and leadership develop strategies for their respective firms. The quality of strategy determines the quality of competitive advantage a firm gets and determines the financial performance of the firm. The ability of firms to develop and deploy strategies is detrimental to the success of their products and services. Design thinking a thinking methodology and a collaborative tool in the methodology improves the ability of the firm to develop and deploy quality strategy that fetches them good financial performance.

SMEs managers are required to take distinct steps like the steps a manufacturing firm takes to implement lean six sigma or six sigma to improve efficiency. The steps required to be taken can be considered from the research outcome of (Straker and Nusem, 2019). In their research they proposed a framework for integrating design into organizations and this can be extended for smaller organizations. They call their framework AIDA model with four distinct stages with design informing each stage. The four stages of implementation

process are awareness, interest, desire, and action. Awareness is the first stage where awareness is accomplished by establishing a database of customer insights and then using these insights to demonstrate the value of design to reveal or identify opportunities for innovation. The second stage is generating interest by applying design methods to projects which have lower risk and high visibility. Outcome from application of the design methods in such projects should enhance trust and interest in design methodologies. The third stage is growing desire among managers and critical employees for design by teaching design methods through applied practice. Nominal challenges can be solved by using design and this will demonstrate and establish the value of design firsthand which is relevant to the firm and further build confidence in design methods that have been implemented. The fourth stage is realizing design action to drive innovation where design proponents can guide design utilization to face emerging challenges with the objective of achieving design integration. Apart from the above mention process steps a few steps can be borrowed from empirical study conducted by (Chen and Venkatesh, 2013). The four steps they proposed can be summarized as, first, to create and distribute end-user profiles across the organization and end user information is made available across the organization functions. The second step is meticulously cultivating organic organizational structures to facilitate and increase collaborations. The third step is to establish design language by using brand image. The final step is related to competitor analysis and in this step competitors design outputs are considered or factored to stimulate design thinking.

From the studies presented, the following simplified stages can be considered as a framework to implement design methods in manufacturing SMEs.

- **Awareness and Interest:** Enough awareness and interest must be created among all the stakeholders. Relevant training sessions should be conducted. The case studies or success stories need to be presented.
- **Strategy formulation:** Human centric approach and design thinking approach should be used for strategy formulation. A broader forum of different functional stakeholders should be included in strategy formulation. The thinking pattern should be as per the pattern mandated by design led process.
- **End user profiles** should be created and shared among all stakeholders. Detailed information from the customer-facing departments within the firm regarding the customer should be published. External sources of information should also be browsed to gain deeper insights. Design thinking methodology tried to discover the problem. The information about the customer, how the customer realizes the value of the product or service should be tried to be obtained.
- **Organic Organization Structure:** Structure of the organization should be designed in such a way that it facilitates constructive coordination and efficient collaboration for tackling customer problems and identifying and exploring business or growth opportunities. Design thinking requires framing and reframing of problems and questions. Interdisciplinary perspectives such as marketing, engineering, r&d or finance can provide fodder for divergent thinking which may lead to more radical innovation. Organization structure to facilitate such a

- coordination and collaboration which minimizes silos thinking and incentivizes broader participation in business level problems should be encouraged and formed.
- **Creating Action:** pilot projects such as proposed by (Straker and Nusem, 2019), projects with low risk but high visibility can be taken up. Learning from these pilot projects can be leveraged for tackling emerging business challenges. Pilot projects can also give an impression to top management about organizational effectiveness to absorb the design thinking methods and generate valuable solutions and output. Corrective measures such as increasing training and hiring design professionals will help further accelerate the learning and implementing process.

SMEs have various programs to improve efficiency. Design thinking can be considered as one program to improve creativity related processes. The amount of information, learning and proximity to the customer that is generated during the process will help generate information which competitors do not have and identify opportunities in the marketplace before the competition. This is tool this is most economical and implementable for SMEs in the manufacturing sector. The other aspect of design thinking considered in this section related to development and design market relevant strategies also makes it a good tool withing SE Context.

CHAPTER VII:

STRATEGIC ENTREPRENEURSHIP DYNAMIC CAPABILITIES

7.1. VUCA Business environment and relevance of dynamic capabilities for SMEs.

The current business environment in India is experiencing rapid transformation. Global competition has threatened the small and medium enterprises in manufacturing. Recently the competitiveness of the locally manufactured products is seen to be decreasing. Recent geopolitical tensions have provided much required support which has resulted in increase of Indian government committed to boost manufacturing within India and furthermore government aggressively encourages and promotes to source and manufacture locally. Volatility and dynamism in the business environment persist. Escalating input cost and supply chain disruptions of electronic parts are becoming a more frequent phenomenon. It is now increasingly difficult to support healthy profit margins and economic sustainability and due to this maintaining business viability for many of the manufacturing firms is still a challenge.

Bigger Multinational companies are leading in modern technology and product development and taking advantage of scale economics for competitiveness. Business ecosystems are increasingly orchestrated and controlled by few companies, example is online marketplaces such as amazon and Flipkart selling even groceries with doorstep delivery. These factors further put pressure on both the supply side and the distribution side of the SMEs. The effect of these changes is profound, and the impact is profoundly beyond profit margins. It is now increasingly difficult for incumbents and SMEs to identify and

seize new opportunities. If the opportunity is identified it is further difficult to exploit due to the resource constraints.

Environmental effects such as emission from manufacturing activities have increasingly been identified as negative or a disadvantage. SMEs are under pressure to reduce emissions and to shift to more sustainable technologies by adopting and using renewable energy, recycled materials, and conserve natural resources such as water and recycling wastewater. All these factors are adding to input cost, While the subsidy policy for adopting sustainable process and materials remain unclear. Recent example been the withdrawal of subsidy for electric two-wheeler by Indian government.

The characteristics of business environment currently prevailing in India and the one faced by SMEs is indeed a textbook example of VUCA business environment (Volatile, Uncertain, Complex and Ambiguous). In spite of the challenges there are still opportunities due to the inherent advantages the Indian economy has like huge young population, higher technology literacy and acceptability, environment consciousness, growing economic and living standard of the people and vast demand for engineering goods to sustain and fulfil the aspiration of the people. Opportunities and resources are widespread throughout this diverse country. Due to the intense competition and prevailing business environments, sensing and seizing business and entrepreneur opportunities is increasingly difficult.

In management literature agility has been traditionally discussed as a business strategy to face a dynamic environment. More recently Dynamic capability has been developed by David Teece (Pitelis and Teece, 2009; Teece and Pisano, 2003; Teece, 2007).

Dynamic capability as proposed and developed by David Teece if used within the context of Strategic entrepreneurship will make SE concept and framework more practical and effective for SMEs. Literature provides some examples where Dynamic capabilities are considered as an important capability that influence organization's opportunity-seeking and advantage-seeking behaviors to improve its entrepreneurial performance. (Amin et al., 2019; Bii and Onyango, 2018; Mustafa et al., 2021; Ziyae and Vagharmousavi, 2021)

The dynamic capability framework needs to be skillfully adopted to SMEs. Dynamic capability framework developed and proposed by David Teece is more relevant and adaptable to big firms and organizations. Development of dynamic capabilities with smaller firms or SMEs in manufacturing will require deeper understanding of its construct and its foundations (Micro and macro). The implications for developing such a capability are required to be assessed in the short term and long term to decide over the resource allocation. The benefits remain more in longer terms than the short term in context with SMEs. The Goal of this chapter within this thesis is to adapt Dynamic capability frameworks to SME and small-scale enterprises by elaborating its micro foundations within the strategic entrepreneurship context. Dynamic capability framework tries to formulate a strategy for selecting and developing technologies and business models that build competitive advantage through assembling and orchestrating difficult-to-replicate assets. Dynamic capabilities therefore try to shape the competition itself.

7.2. Overview of dynamic capability as developed and proposed by David Teece

Dynamic capability according to David Teece is ability to sense and shape opportunities and threats, to seize opportunities, and to keep competitiveness of the firm

by enhancing, combining, protecting, and when required, reconfigure intangible and tangible assets of the business enterprise. Dynamic capabilities are the core element that decides the entrepreneurial success or failure of a firm. Dynamic capabilities include difficulty in replicating enterprise capabilities needed to adapt or align to changing customer and technological landscape. Dynamic capabilities further strengthen and improve firms' capability to shape the business ecosystem it operates in by enabling the firm to develop relevant new products and processes. Dynamic capabilities improve firms' ability to assess current business environment and enable firms to design and implement viable business models to respond to changes.

David Teece one of the originator of the concept of dynamic capabilities framework considers enterprise success to depend upon few crucial factors such as the discovery and development of opportunities, ability to effectively combine internally or externally generated inventions, ability to be efficient and effective in technology transfer inside the enterprise and between and amongst participating enterprises, ability to protect intellectual property, ability to adopt and implement best practice in business processes, ability to for invention of new business models, ability to make unbiased decisions and capability to achieve protection against imitation and other forms of replication by competitors. These factors are the factors essential for gaining a sustained competitive advantage and sustaining superior returns even under a dynamic business environment. According to David Teece the development of dynamic capabilities within a firm requires deeper insight into micro foundations of such capabilities. Dynamic capabilities micro foundation are firms distinct skills, processes, procedures, organizational structures, decision rules, and

disciplines needed to gain abilities in sensing, seizing, and reconfiguring capacities (David Teece, 2007).

7.2.1. Sensing capability: Construct of dynamic capability and strategic entrepreneurship

In a global competitive environment where customer requirement, technology and competitive supplier activities are constantly evolving and changing, opportunities are observed to be evolved or generated for both the new startups and incumbent firms. This constant change pressurises the revenues streams and profit margins of the established firms. The probable patterns of change or new requirements are not that easy to spot or sense. Some patterns can be obvious, but majority of the opportunities are difficult to identify especially for SMEs and smaller firms due the limitations of resources deployed to obtain information. Fundamentally opportunities can be detected by the enterprise because of two classes of factors as mentioned by Kirzner and shumpeter. First factor is as stressed by (Kirzner 1973), that entrepreneurs can have differential access to existing information that is not all firms have similar level of information. And the second that the new information and new knowledge (exogenous or endogenous) that firms will possess or generate can create opportunities and this is as emphasized by (Schumpeter 1934). For opportunity discovery the new information is required regarding a requirement or application. The firms thus should have ability to obtain the information and convert this information into a business proposition. The Information may not be obvious. If a firm obtains information before the competition or the competing firms, the firm has opportunity to convert this information into business product or service.

(Teece, 2007)The literature on entrepreneurship puts more importance to the argument that opportunity discovery and creation originates from the cognitive and creative capacities of individuals. That is the capability of the individuals or managers, and leadership team plays a vital role in opportunity discovery and creation. Dynamic capability framework proposes that discovery should be ingrained in organizational processes. This fundamental creative and sensing ability in its process and structure will not be equally present in all the competing firms or enterprises. Many firms depend upon the greater cognitive ability of entrepreneur to sense the developing patterns of market requirement to improve the prospect of the firm for shaping the opportunity into product or service. Many firms continuously scan marketplaces, they indulge in frequent customer interactions and feedback and analyse technological solutions for the needs they identified through such exercises. Continuous scanning and monitoring of technology evolution, customer preferences, global trends must be done by various functional division of the firms and for this process and structure should be present. The ability to sense is not automatic or intuitive but is purely the function of cognitive capability of the individuals tasked to source the requisite information or read and interpret the information as it evolved in the dynamic conditions. Early sensing of such information provides advantage as the sensed opportunity can be further rapidly shaped into a product or service before the competition.

Dynamic Capability construct proposes to have cognitive abilities to sense and shape opportunities with the enterprise that is within its process and structures and along with its competitive individuals. To understand the underlying elements for such a cognitive

capability (Helfat and Peteraf, 2015) performed a study, and they identified that perception and attention as important cognitive capability to be able to perform sensing function. Managers require cognitive capability in identifying new and emerging patterns in markets and in interpreting data to sense opportunities. In context with SMEs only few of certain individuals in the enterprise may have the necessary cognitive and creative skills which will limit the sensing capabilities. Hence it will be more beneficial and effective if the activities like scanning, interpretative, and creative processes are embedded inside the enterprise itself or in its process. Organizational processes can be developed inside the enterprise to garner and source new technical information, tap developments in external scientific research, continuously monitor customer needs and competitor activities, and develop abilities to shape opportunities for new products and processes.

For sensing opportunities and threats following actions and activities are required to be embedded in organisational process:

- Sensing by research and development: R&D can be responsible for gathering the relevant information related to technological developments through collaboration with technical universities. R&D division should scan complete business ecosystems and collaborate with suppliers or customers or complementors for possible innovation activities.
- Sensing by customer interaction: Customer interactions and feedback should be encouraged. R&D engineers, top managers and executives should interact with customers to sense the changing needs and preferences. Many of the SMEs (Tier-1 or 2) are suppliers to bigger Firms this bigger firms are more visionary to spot new

patterns and technology trends and begin more elementary or exploratory development. Such developments may provide vital information for future requirements of the customer which may trigger development of new valuable products or services.

- Sensing through Suppliers: Similar customer interaction and feedback suppliers can be a source of information. Regular contact of R&D engineers with suppliers and forums to discuss common problems and challenges related to technology, engineering and resources will have increase flow of diverse information and perspectives. Moreover, the firm may get an outsider view for procedures and process.
- Open innovation helps to broaden the searching and scanning. Solutions to customer problems can be generated by combining complementary innovations. Exploration that has broader context and broader boundaries will generate greater impact than the more confined or local scanning. Closed link between corporations and academic institutions accelerates not only the pace of development but open new channels for novel scientific information which would fuel either new or complimentary services or products.

In Dynamic Capability framework sensing of opportunity is not enough, firms should be able to predict the response of the suppliers, competitors, market, and customers. The firms need to develop ability to identify and understand how the stakeholders will respond to perceived changes and proposed products and services. Firms should be able to predict when and how competition will respond. Sensing in such a way and sensing for

opportunities and then analysing the opportunity within the business ecosystem necessitates application or deployment of analysis frameworks or analytical frameworks and application of such analytical framework will positively impact scanning and searching activities. Normally porters five forces framework is considered for performing analysis. The Important distinct precept of dynamic capabilities is the necessity of scanning and searching across the whole spectrum of business ecosystem and not just in that industry segment. Ecosystem may consist of different industry segments. Dynamic capability framework considers complete business ecosystem. Business ecosystem is defined by community of similar organizations, institutions (Governmental, legal and academic), and individuals that impact the enterprise along with its customers and suppliers. The community in the framework includes firms which are complementors, suppliers, regulatory authorities, standard (policy) setting bodies, the judiciary, and educational and research institutions. To convert the sensed opportunity innovation capability is required and to create necessary differentiated products or services. Dynamic capability framework hence recognizes the role of innovations and its supporting infrastructure on competition. Small enterprises and many multinational enterprises find it difficult to gather the relevant data like statistical data and technological development data. Managers thus have limited ability to completely evaluate and analyse the future course of business for a new opportunity or threat. If the data is present the managers inherent capability to correctly infer and take appropriate action leading to economic gains is questionable. Small firms' managers capabilities are assumed to be limited (Especially in developing economies like India). Under the mentioned constrains many firms still deploy traditional tools like SWOT

analysis or porter five force framework to perform industry analysis. This action contradicts dynamic capability perspective that argue that is critical of porter's framework as it does not consider the dynamic nature of the market and ecosystem. Dynamic capabilities perspective argues that porter's framework ignores many aspects of the competitive environment including the role of complementarities, path dependencies, and supporting institutions. Thus, the dynamic capability framework provides an analytical framework to analyse the complete business ecosystem rather than the industry. It provides firms direction to react to business dynamics by gathering and filtering technological, market, and competitive information from both inside and outside the enterprise and making sense of information in context with the firm's strategic position and status. The activities that generate or gather information thus are now put at the CenterStage in sensing aspect of dynamic capabilities. To develop dynamic capabilities organizational processes must be developed and put in place inside the enterprise to gather novel technical information, tap external scientific developments, closely monitor customer needs and competitor activity, and shape opportunities for new products and processes. Process should be designed such that they direct the information gained to the right personal or organizational divisions who can rightly make sense out of it or identify new or present threats or opportunities. Organizational process should be designed and develop to encourage internal cross functional discussions, encourage development of hypotheses about market or products and testing of such hypotheses. SMEs Organization will be thus fundamentally able to generate the relevant facts, data, and information needed to make a confident decision in resource allocation.

The Organizational architecture influences efficiency and effectiveness of sensing capabilities. For SMEs which are easier to configure due the relative size as that of the big organization the organizational architecture to foster dynamic capabilities should be deployed. According to (Felin and Powell, 2016) Organizational architectures which has distributed decision making power across hierarchy (polyarchy) and architecture that tends to generate coordinated behaviour among individuals (social proofs) have greater ability in identifying and capturing opportunities. According to them following capabilities are required to be developed by firms for sensing.

- Develop and identify key functions and resources which garners new knowledge about technology and market and develop process and procedures to capture this.
- Develop sensor outside and inside firm boundaries.
- Develop appropriate rewards and recognition schemes to motivate.

7.2.2. Seizing (opportunity) construct of dynamic capability and strategic entrepreneurship.

To achieve economic gains opportunity which is sensed organizations and firms should be able to convert it into revenue stream through design of proper process for generating customer offerings which may be a service or products. The firm will require to improve its technological competences and complementary assets. Firm should be able to incept and design a proper business model to exploit the identified opportunity before the competition. Implementation of relevant business models and associated enterprise boundaries for its functioning is fundamental elements of business success. Business model adopted also hugely affects the success of products and services. The decision to deploy

the required business model to appropriate value to the firms' activities for generating the service or product offering will impact both short term and long-term revenues streams. Decision about investments or allocation of resources are required to be made. In the dynamic business environment, the investment decisions and seizing of opportunity decisions are not straight forward or outcome traditional accounting calculations. As the uncertainty is high, managers will have to make decisions regarding products and services when the future is quite uncertain. In such an environment, investment will involve commitment to financial resources based on a learned hypothesis about the technological and marketplace future. Foresight and forecasting will have to be adopted to make decisions. The strategy must be formulated accordingly for investments decisions, for the implementation timing, for building on increasing return advantages, and for leveraging products and services from one application to another. Some real application market tests should be performed such as by generating minimum viable product or design. Flexibility will be required to be adopted until the dominant design emerges and then invest heavily once a design looks like it can become a potential market performer. It is important to note that the modern-day accounting and financial models may fail to identify business potential of identified opportunity and hence may impact (Stop) the possible investment to develop the innovation or idea. Dynamic capability framework provides ideas and information in a dynamic environment. Many of the accounting financing practices are adapted for a more static business environment regarding the acceptance criteria for investment. It is important to implement proper tools in finance. Tools and techniques for decision making under uncertainty are available and should be used knowing their extant features and limitations.

Financial models, tools and techniques that are deployed in decision making in an uncertain business environment involve estimating revenues from interdependent and cospecialized products and services and estimating cost for investing in such a cospecialized assets. In traditional finance tools and techniques for investment decision making there is little recognition for valuing intangibles and for considering features such as co-specialization, irreversibility, and opportunity costs. This may provide incorrect business potential of the opportunity identified and constrain the organization in taking relevant action or initiating process to seize the business opportunity. This is the result of improper application of financial and accounting tools to generate business cases. Dynamic capabilities require an organization to develop relevant financial modelling capabilities to estimate the cost and returns of an investment in an uncertain business environment.

7.2.2.1. Dynamic capability micro foundations

The Goal of SMEs in VUCA environment should be develop dynamic capabilities for sensing, seizing, and transforming the business and shape the ecosystem it operates in. Sensing, seizing, and transforming require fundamental abilities within the firm. The abilities can be tangible or intangible. The goal for leadership or SMEs is to understand where dynamic capabilities are present, how they can be developed and how the existing capabilities are required to be further evolved or upgraded. The decision for investments for developing firms' resources in the form of tangible and intangible assets will be greatly influenced by the need to create dynamic capabilities. Micro foundation that are identified by David Teece in his paper published (David Teece, 2010; Pitelis and Teece, 2009)are

reproduced here. The Micro foundations described are considered in context with strategic entrepreneurship construct for application to SME in manufacturing sectors.

7.2.2.2. Selection of product architectures, business models and enterprise boundaries.

The business model provides a plan for the organization and develops a financial architecture of a business. This plan has assumptions about the flow of revenues and costs, and likely behavior of the customer and competitor. In essence the business model is management's hypothesis about customer requirement and how an enterprise should align their resources to best meet those needs. Business model has a brief about technologies and features to be considered for products and services, revenue and cost structure, assembly strategies for technologies, target market segment and nature of value capturing mechanism. Designing, implementing, and validating business models is not straightforward as there are many elements that need to be considered and many of the business aspects or interpretation of the information required for business model generation are not in proper context. For bigger organizations many of their managements routinized and codified the business model generation process. SMEs firms tend to devise the business model depending upon their experience, the environmental effects and the changes in the ecosystem are missed. Designing a new business will now require creativity, insight, and a good deal of customer, competitor, and supplier information. A business model generation requires intelligence and complete knowledge of the business ecosystem.

For SMEs in emerging economies and especially in India where the competition tends to be from local firms as well as from low-cost Chinese or south Asian firms the need

for differentiated business model is greater. Dynamic capabilities framework considers capacity to create, adjust refine and re-generate differentiated and effective business model as fundamental capability. Designing such a business model requires creativity in the management team, ability to get insights, and ability to get deeper information and intelligence of customer, supplier, and competitor. For a firm to thrive on a new idea for a product or service a differentiated and hard-to-copy or imitate effective and efficient strategic architecture of an enterprise's business model is important. If the enterprise can successfully analyze multiple alternatives and develop and possess deeper understanding of the user needs, it positions itself to develop an effective business model. Firms' ability to perform a broader and deeper analysis of the complete business value chain and design a cost-effective delivery model for delivering values is a prime requirement for developing innovative business models. SMEs management is required to develop decision making ability regarding outsourcing or insourcing by overcoming bias and tendency to persist on established routines. According to David Teece a good business model should enable innovators to capture a large portion of social value generated by achieving appealing cost and value propositions to customers.

For Manufacturing firms where the fundamental nature of the business is high capital industry many of the processes or functions are required to be outsourced. Many of the automotive companies in India source important components of vehicle such as engines from other firms. Tata sources diesel engines from fiat who are pioneer in turbo charged common rail direct injection engine. Thus, the rapid technological development and technological progress makes the setting of enterprise boundaries an important function.

Enterprise boundaries are required to be set correctly as this element of business decision is an important element of getting the business model right. Firms should have no prejudices or resistance against technology from the outside. Firms should develop and hone their absorptive capacity of external technology through learning activities and skill accumulation. (Chesbrough and Teece, 2009; Teece, 2000) provide a framework for setting up the enterprise boundaries and the key elements of this framework are the appropriability regime which is related to the interfaces of the firm with its ecosystem, it is the firm's ability to develop natural and legal protection for its unique know-how or innovation, the other element is the nature of the complementary assets (cospecialized or otherwise) that an innovating enterprise possess, the relative positioning of innovator and potential imitators with respect to complementary assets and the phase of industry development (pre or post the emergence of a acceptable design) (Chesbrough and Teece, 2009; Teece, 2000). The boundaries of the enterprise need to be skillfully framed or contoured for each major innovation. In dynamic capability framework, the ability and capability of enterprises to procure external technology as well as development of technology within its boundaries are critical skills. These skills also include the management's ability to make unbiased decisions, learn and absorb external technology and have good analytical capability to understand the capabilities with its value chain. That is ability to evaluate the capacities of the firm in participating in the value chain both upstream and downstream. These skills will improve management's ability to contour firms' boundaries effectively.

7.2.2.3. Management of complements and platforms.

Modern day products and services are integration of many technologies and sub products. Complex integration of technologies into a product is performed seamlessly that the customer or the end user often do not realize presence of multiple sub products and for High technology products customers view such products as systems. The systems consist of many components which may be dependent or independent of each other. These components are integrated with each other or connected to each other by a platform. The role of the platform is to integrate multiple services or products to create one system. Customers want systems and not platforms. This opens possibilities for the participating firm and its technology or product to cospecialize with other component providers that are operating on the platform. Due to this there is now new and more importance to specialization and strategic decisions related to complementors and platform providers. There is now a possibility of engagement with platform developers. Often platform owners need complementary products to be provided by others particularly when it has little or no relevant skills to develop them. The engagement of complementors and platform providers would now require a more strategic outlook and more dynamic information regarding this aspect. This is important for small SMEs. This is due to the fact that there is now a new possibility for the development of new co-specialized products and services with other firms within the ecosystem and platform. This ability of the firm's management to develop strategies with related complements and platform influences its dynamic capabilities.

7.2.2.4. Decision making ability by avoiding bias, delusion, deception, and hubris.

Majority of the small firms and manufacturing firms in India lack the cognitive and disciplined managerial skills to identify and avoid preexisting biases, delusion, excessive risk aversion tendency and inherent tendency to resist change. David Teece (Pitelis and Teece, 2009) observes that in bigger organization proclivities toward decision errors are not uncommon in managerial decision-making. They observe that organizational decision processes often display characteristics that seem to not comply even with basic principles of rationality. And often decisions are bizarre. Investment decision errors they identified include excessive optimism about market or product, loss aversion or risk aversion, isolation errors, strategic deception, and program persistence even against negative KPIs of the program (Nelson and Winter, 2002). Enterprises smaller or bigger are required to bring discipline in their ability of decision making to completely remove any type of bias, delusion, deception, and myriads of unwanted information. Techniques and skills to bear such discipline are an element of managerial capability. Competitive advantage can be gained by early adopting such techniques to overcome decision biases and errors. Overcoming biases requires a cognitively sophisticated and disciplined approach to decision making and such an approach should be practiced. Innovation involves novelty. Creativity involves novelty. Without novelty there is no breakthrough product or idea. Management should understand the inherent proclivity to resist novelty in an established firm. Established firms have established routines and structures to serve the static demand of market. These routines and structure resist change and if not identified would quench

creativity and innovation. Breakthrough innovation should progress to profit generating service or product. A wrong decision regarding innovative ideas or products would cost a firm. Managers should adopt radical, nonformulaic strategies to overcome the inertias that inhibit breakthrough innovation (Handy, 1990; Malone and Davidow, 1992). In literature it is observed that corrective strategies encourage change through two basic mechanisms (1) design organizational structures, incentives, and routines that promote and reward creative action; and (2) develop routines that enable the continual shedding of established assets and routines that no longer yield value. Organizations thus should be able to deploy strategies that provide structures, incentives, and processes to promote and reward creative action and such strategies further serve to reduce problems such as excessive risk aversion. Regarding bias towards established assets, executives of an organization must be knowledgeable about the effect of interaction of owning established assets and how this may pop up as a decision-making bias. Executives should have the ability to identify dead or dying assets. Many recommended strategies require identifying and then disposing of established non-performing assets and capabilities along with any complementary assets, and administrative routines to reduce their intensity of decision-making biases. These dying assets are the source of cannibalization phenomenon. Cannibalization in managerial behavior to stick to unproductive assets, strategies, routines, and process instead of adopting new assets and strategies. Such sources of the “anti-cannibalization” bias should be removed by the management. Management should have the ability to identify self-serving behavior of its executive inside the enterprise to protect their divisions or functions against novelty such self-serving behavior results in strengthening bias in decision making.

Apart from managerial cognitive abilities the implementation or consideration of a flawed investment frameworks also contribute to bias in decision making.

Capability of leadership and top management in making quality decisions avoiding bias, communicating goals, values, expectations, motivating employees and other constituencies, garnering loyalty and commitment and achieving adherence to innovation and efficiency effects organization performance. Top management and leadership team of SME should have superior capability in decision making and such capabilities require avoiding bias, delusion, deception, and ability to dismantle information hubris. The extent to which decision-making capabilities are developed (Which are not equally present among competitors or within industry) in effect will lead to superior performance. Figure 12 effectively summarizes the micro foundations required in the executive for making quality decisions and for their execution. The ability of the management to take decisions regarding its structure, develop procedures and design incentives for seizing opportunities is important dynamic capability.

7.2.2.5. Managing threats and reconfiguration

Dynamic business environment has all the characteristics that define VUCA business environment. The Dynamics in market, customer behavior, competition, technology landscape, supply chain constraints, and depleting resources pose a major challenge to strategist. The fundamental aspect of Dynamic capability framework is the organization's capability to recombine and reconfigure assets and organization structures in response to the growth demands of the enterprise as technologies and markets change. Such strategies adopted by the organization ensure profitable growth and alignment to

changes. Profitable growth will also lead to the requirement for increasing or improving upon enterprise-level resources and assets. The ability of the firm to reconfigure itself will help firms to evolve into the future, thus reconfiguration will maintain evolutionary fitness of the firm and eliminates its unfavorable path dependencies. Path dependence is the propensity of the firm's executive to take decisions based on the firm's previous or historical path. As enterprises evolve and start to establish themselves, strategies and routines are established to improve efficiency. Improving efficiency is the primary goal for SMEs and manufacturing firms as they try to serve static market demand. But as the business environment change routines must be changed. The ability to change and establish new structures should be the fundamental capability of the firm. As previously explained, if the changes are not performed the established incentive and organizational structure can hinder innovation by being biased in decision making. The presence of fixed assets narrows the searching and scanning due to the tendency to align with the present asset, and this makes acceptance of novelty and innovation difficult. David Teece observes that many enterprises tend to frame new problems in a manner that is consistent with the enterprise's current knowledge base, assets, established problem-solving approaches and established business models. This tendency leads to ignorance of opportunities and potential innovation that would be identified while solving the new problem with a new outlook. Due to the factors mentioned firms face resistance for reconfiguration and realignment, as the inherent persisting bias and cognitive abilities of functional heads derail the process of change.

In consideration with dynamic capabilities framework for SMEs top management and leadership skills and capabilities are required for achieving continuous asset orchestration and business renewal. The ability to redesign and establish new routines is important to be developed and acquired by the management team. Under dynamic conditions and severe competitive environment superior profitability dynamic capability framework mandates continuous efforts to build, maintain, and adjust the complementarity of product offerings, systems, routines, and structures to align to the changing business dynamics. Management should develop the ability to minimize internal conflict and maximize complementarities and productive exchange inside the enterprise. Management should be able to perform periodic and continuous asset orchestration involving achieving asset alignment, coalignment, realignment, and redeployment. Redeployment and reconfiguration should consist of activities and actions such as business model redesign, asset-realignment activities and revamping of routines. Redeployment can involve transfer of non-tradable assets to another organizational or geographic location. Periodic consideration and evaluation of possibilities for mergers, acquisitions, and divestments should be considered. Redeployment of capabilities can be explained as the activities performed to evaluate and share capacities and abilities between old and new assets. Redeployment activities may also consist of evaluation for transfer of capacities from one geographic region to another or from one market to another market.

7.2.2.6. Decentralization of organization structure

Organization structure influences the ability of the organization to respond to change and it influences the timeframe within which the response is generated. For

dynamic capabilities to manifest at various function and divisions within the organization and to continuously generate a response to changing customer requirement and new technologies high degree of decentralization is required. Centralized decision making which can be characterized as adherence to formal rules and procedures and exercise of tight control of information flows and enacting elaborate reporting structures inhibit dynamic capabilities. Decentralized decision-making managers can control different decisions as they are able to observe relevant information to their functions. This improves flexibility and responsiveness with centralized decision making. SMEs and Manufacturing firms with limited number of divisions have both centralized and decentralized structures for decision making. The value generated for the customer or the potential for generating end user benefits dictate the architectural structure for SMEs.

Dynamic capabilities are enhanced by adopting decentralized structure for both SMEs and Bigger organization with varied functional divisions and for achieving decentralization organization needs to develop ability to achieve integration of these functions seamlessly. The integration should generate tangible value for all stakeholders. If a customer does not benefit from a product which is integrated with other product offering or when sourcing and other inputs do not benefit from integration, then decentralization benefits and corresponding efforts can be of no value. Management's ability to identify and implement decomposable subunits enhances performance only if customer and supply considerations allow decomposability. When decentralization is done, the management team or the leadership team should establish various forums for collaboration and integration. This would prevent the organization from becoming

conglomerates of individual profit centers. This would further inhibit innovation and decrease organizational agility. Integration and collaborative forums and other meetings are necessary, and the leadership team should have the ability to avoid formation of power groups inside the firms. This tendency to drift should not be deterrent to create a decentralized structure. In a fast-paced environments organizational independent functional units must have considerable autonomy that will help to make decisions rapidly and at the same time the units should remain connected to activities that must be coordinated with other functions.

7.2.2.7. Management of Co-specialization

To develop an inimitable competitive advantage in products and services the firm's management and leadership ability to identify, develop, and utilize combination of specialized and cospecialized assets is an important dynamic capability. The competitive advantage and probability for a superior return is greatly enhanced by the ability of firms' top management to identify requirements and opportunities to invest in cospecialized assets. This asset can be developed through its own internal development program or purchased externally and this capability to develop or acquire is fundamental to dynamic capabilities. Firms and entrepreneurs and managers should have the capability to identify or create special value and revenue streams by combining cospecialized assets inside the enterprise. Top management should be aligned to such proclivities as such strategies may require investments to create the necessary cospecialized technologies. Dynamic capabilities framework recognizes that "strategic fit" as enacted by Michael porter in his framework for industry competition analysis needs to be continuously achieved and unless

this concept is put into practice and operation it has limited benefits. The key dimension of such a strategic fit within dynamic capability framework is co-specialization. Co-specialization can be a strategic fit between two assets, or it can be a fit between strategy and structure and in it can also be a fit between strategy and a process. The concept of co-specialization is important to both seizing and reconfiguration. In a business environment characterized by rapid change in core business parameters there will always be a requirement for a continuous or at least for a semi-continuous realignment of firm's assets and resources. Cospecialized assets also can be considered as a particular type of complementary assets where the value of an asset is a function of its use in conjunction with other assets, and due to this co-specialize joint use the overall value is magnified (David Teece, 2010). Co-specialization improved firms' ability for differentiated product offerings or unique cost savings and either of the two outcomes generates a competitive advantage. This is because competitors will find it difficult to imitate the co-specialization advantage either by development or acquisition. Thus, the ability of a firm to develop co-specialization within its products, structure, strategy, and process is an important dynamic capability. This construct of co-specialization will help SMEs to generate varied offerings to the customer, reduce input cost and provide a sustainable competitive advantage. Many organizations in manufacturing with special production or manufacturing techniques consider the assets for service. That is their unique machines can be used for other similar products by other firms and they are able to extract economic rent.

7.2.2.8. Capabilities in learning, knowledge management, and corporate governance

In context of dynamic capability, the ability of a firm and the capability of its leadership team to integrate and combine assets, including knowledge and important know-how, is a core skill. The ability of enterprise firms and its capability to organize routines and align structures with an objective of effectuating combination of know-how within the enterprise, and between the external institutions, firms and organizations is an important capability. Organizational ability in its routines and functional structure for integrating know-how from external sources as well as within the enterprise can be an important capability for business success. When systems and networks are present these skills for integration become more important. A key micro foundation of dynamic capability is the ability to design good intensives, create learning and knowledge sharing and knowledge integrating procedures. In Dynamic capability framework there is equal importance for monitoring and managing the leakage, misappropriation, and misuse of knowhow, trade secrets, and other intellectual property and such capabilities within the various management levels are identified as critical for business performance. The firm ability for development of governance mechanisms to facilitate the flow of technology and at the same time protect intellectual property rights from misappropriation and misuse are also foundational to dynamic capability.

7.2.2.9. Dynamic Capabilities orchestration Skills and competitive advantage

An important characteristic of dynamic capabilities is that it enables firms' ability to develop their core capabilities which enables the firm to generate a competitive advantage in regimes of rapid technological change. According to David Teece (Pitelis and Teece, 2009, 2009) Dynamic capability framework postulates that past will impact current and future performance of the firm and management is required to simultaneously design processes and structures to support innovation while it dissolves dysfunctional processes and structures designed and developed in the past or earlier period when business environment characteristics were different from the present. The core elements of dynamic capabilities framework are to enable enterprise to develop and employ superior non-imitable dynamic capabilities, these dynamic capabilities will then determine the nature and amount of intangible assets and organization will be able to create or assemble that will propel the organization for superior performance. In this context the strategic function of management of a firm is to find new combinations within or external to enterprise and institutions that will enhance the value it generates. Firms and organizations should be able to develop skills in three organizational and managerial processes which are coordination or integration of process, learning and reconfiguring. The ability of the organization to coordinate and integrate its various processes, its ability to learn and ability to reconfigure will enable it to orchestrate un-imitable vital business intangible assets in the form of skills and process. These processes and assets that are developed can be considered as a sub part of the process that support sensing, seizing, and of the process that manage threats. The

objective of dynamic capabilities framework is to identify and capture the key variables and relationships that are required to be altered or manipulated to create, protect, and leverage intangible assets to achieve superior enterprise performance. Such assets improve the ability of management to reconfigure, allocate or reallocate, combine, or recombine resources and assets to respond to the changing business dynamics.

Enterprises irrespective of their size and industry segments are required to develop capabilities in sensing, seizing, and transformation or reconfiguring capabilities to orchestrate and maintain competitive advantage. Conflicts in resource allocation to simultaneously developing competitive advantage and seizing and sensing opportunities should be managed. It should be noted that in dynamic capability framework seizing and sensing are different in exploration and exploitation. In this framework sensing does not necessarily involve large commitments of resources and at least not relative to seizing. Dynamic capability framework considers and proposes optimum investment in terms of resources for sensing activities. This optimality of investment in sensing capabilities neutralizes the conflicts related to seizing. Dynamic capabilities provide sustainable competitive advantage when such capabilities enable the firms to orchestrate or develop non imitable capabilities and abilities in creation, integration, and commercialization of a continuous stream of innovation which are according to the customer needs and consistent with the evolving technological trends.

7.3. Conclusion: Managerial Implication for development of dynamic capabilities for SMEs

From various aspects of dynamic capabilities and the foundational elements on which such capabilities can be developed, that are argued in this chapter following guidelines to orchestrate routines methods and process can be consulted.

- **Selection of Product architectures [product strategy] business models and enterprise boundaries:**

If a firm is engaged in manufacturing a product the product architecture should be reconfigurable. Product architecture should have relevant interfaces with other products outside the firm's capabilities. Architecture should permit integrability of external technology and products.

If a firm is engaged in manufacturing as a service, the architecture of its setup should permit reconfigurability. It should be architecture like product architecture should be able to integrate external services and technologies cost competitively.

This leads to the decision of designing the enterprise boundaries. Rigid boundaries are not recommended. Enterprise boundaries should be developed such that there is competitive flexibility and there is possibility of interaction across the boundaries with cost effective integrability.

- **Design organization structure for decentralization and governance.**

In General, the SMEs in manufacturing center in India are observed to have centralized structures, this is due to the social-cultural environment. Decentralization of decision making is highly recommended in dynamic capabilities. Governance and model

and accounting model can be implemented to decentralize decision making. With effective governance and accounting methods control can be exercised over the operational proceedings and at the same time decentralization of strategic decisions can be achieved.

- **Develop the ability to avoid bias, delusion, deception in decisions.**

Data driven decision making should be routinized. Business processes should be designed not only for efficiency but also for feedback mechanisms that develop data and information for managers and leaders. The decision should be based on the data that is produced. Biased in decision making can be identified if the data is available.

SMEs Business processes thus should be developed to have integrated feedback structures that generate data and information for managers and leaders. This information should be made available to all the stakeholders involved in strategic planning and decision making. This will reduce the probability of biased or delusional decisions.

- **Develop capabilities in learning and knowledge management.**

Experimenting and iteration, development of minimal viable products and services along with relevant business processes is core of modern-day business. In SMEs the knowledge and expertise horizon are required to be incrementally broadened. Routines to systematically conduct experiments [Design thinking: as proposed in this thesis] should be established. Ability to perform learning activities internally or externally are required to establish. The knowledge management structure should be formulated and practiced.

- **Develop capabilities in Sensing opportunities** [exploring for business opportunities] and threats following actions and activities are required to be embedded in organisational process:

- Sensing by research and development: R&D can be responsible for gathering the relevant information related to technological developments through collaboration with technical universities. R&D division should scan complete business ecosystems and collaborate with suppliers or customers or complementors for possible innovation activities.
- **Sensing by customer and supplier interaction:** Customer interactions and feedback should be encouraged. R&D engineers, top managers and executives should interact with customers to sense the changing needs and preferences. Many of the SMEs (Tier-1 or 2) are suppliers to bigger Firms this bigger firms are more visionary to spot new patterns and technology trends and begin more elementary or exploratory development. Such developments may provide vital information for future requirements of the customer which may trigger development of new valuable products or services. Similar customer interaction and feedback suppliers can be a source of information.
- **Open innovation** helps to broaden the searching and scanning. Solutions to customer problems can be generated by combining complementary innovations. Exploration that has broader context and broader boundaries will generate greater impact than the more confined or local scanning.

The ability of the firm to identify threat can be linked to its ability to identify opportunities. If a firm can see opportunities before competition, it can see threats also before the competition. For both the cognitive capabilities of managers and leaderships of the SMEs plays a vital role. More skilled the leaders or the management team more

competitive capabilities execute the operations and business. Similarly, more entrepreneur the leader or the management team more opportunities it identifies. In General, the individual capabilities of the leader and managers dictate the outcome. Dynamic capabilities aim to delink the managerial or leadership cognitive and entrepreneurial capabilities from entrepreneurial outcome. It tries to provide guidelines to develop routines process and structure in business process wherein the individual skill set have little effect on the business outcome. These make the dynamic capability framework a very potent managerial tool for SMEs in developing economies like India. Core elements of dynamic capabilities and on what foundations they are developed were described in this chapter. From this element presented as set of strategies can be formulated or orchestrated. From literature presented in these chapter a guideline presented here can be considered for developing the dynamic capabilities in Manufacturing SMEs.

CHAPTER VIII:

STRATEGIC ENTREPRENEURSHIP AND BUSINESS MODEL REGENERATION

8.1. Business model innovation definitions

Business model in essence is how a firm captures and deliver values. Every entrepreneurial firm has to have a business model which is resilient to the prevailing competition and provides sustained profitability and superior value to the customer.

(David Teece, 2010) defines the business model as the manner in which the enterprise deliver value and entices customer to pay for the value delivered and thus make profit from such payments. Business model essentially is reflection of managements hypothesis about customer needs or wants and how they want it. Enterprise organize and operates to meet the needs of customer and in return make profit.(David Teece, 2010). Business model describes the system of interdependent activities that are performed by the firm and by its partners and the mechanisms that link these activities to each other (Amit and Zott, 2012). Business model consists of indentifying and important ument job or need of a target customer, palnning or generating a blue print to accomplish the job profitably and implementing and evovling the model testing assumptions (Eyring et al., 2011). (Chesbrough and Rosenbloom, 2002) defined business model as one which articulates the firms value proposition, Identifies a market segment and specify the revenue generation mechanism, defines the structure of the value chain required to create and distribute the offering and complementary assets needed to support position in the chain, details the revenue mechanisms by which the firm will be paid for the offering, estimates the cost structure and profit potential, describes the position of the firm within the value network

linking suppliers and customers, formulates the competitive strategy by which the innovating firm will gain and hold advantage over rivals (Chesbrough and Rosenbloom, 2002).

It is important to capture value or profits as the firms tries to meet the customer needs through developing products or services. Business model is the framework which describes how the value is created and captured. Business model innovation can be a principle source of differentiation and competitive advantage (Brown, 2008) .Studies conducted by (Sosna et al., 2010) observed that the business model changes are among the most sustainable forms of innovation, further they observed that the success of new business model is not easy and the failure rate is high and the main diffculties is at exploratory and implementation stages. Although new business models are difficult to implement (Chesbrough, 2010) Observed that new and innovative business models are necessary to mediate between novel technologies and markets. New technologies and new products derive more value and superior returns for the firms with novel business models adopted in the conjunction with the new products or services. (Osterwalder and Pigneur, 2010) designed the Business Model Canvas (Figure 1) which illustrates a business model visually. Compiled of nine building blocks (customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partners and cost structure), the canvas is a tool used to unpack a company's business model.

Table 3 (Osterwalder and Pigneur, 2010) Proposed Business model canvas

Key Partners	Key Activities	Value Proposition	Customer Relationship	Customer Segment
	Key Resources		Channels	
Cost Structure			Revenue streams	

8.2. Relevance of business model innovation for indian entrepreneurs

In emerging market like india, where the manufacturing sector has tremendous amount of cost pressure. The domestic market do not for majority of the products and services provide the necessary profit margins. While an acceptable level of capability to produce a product or service to meet the market demand exist with the entrepreneurs the capability to gain superior financial returns does not exist with majority of the entrepreneurs. For many firms operating at lower or near zero competition is the norm. This is primarily due to the micro economical factors prevalent in the emerging market. As the resources start to deplete the input cost for majority of the products has seen a sharp rise recently. Energy prices in most of the continents remain at all time high. In india the fuel cost remain high which in turn effects the logistic cost. The loan interest levels in India remains high this makes servicing of loans costly and further eording the profit amount. As the country progresses the living standard is observed to be rising this in turn furhter impacts the input

cost by having necessity to increase the wages of the workforce. Attracting and retaining the relevant human resource talent is a challenge and maintaining a quality workforce is an economic challenge for most of the entrepreneurs. Low cost products from china and other countries flood indian market the cost pressure further increases

Product innovation or process innovation alone won't help to create the required financial gains. As the innovation or the product has to be effectively delivered to the end user at a cost he is comfortable to pay and at the cost which provides the entrepreneur with the requisite economic margins. Considerable investment is made in product and process improvements and innovation by entrepreneurs. But it is a general observation that the aspect of Business model design or Innovation is comparatively paid little attention. Traditional business model is preferred choice for conducting the business. Product development or process efficiency (Six sigma, kaizen etc) improvement have been attracting increased investment and attention. The capability to design and manufacture the required good and services for the prevailing market demand remains at acceptable level but capability to design for Business architecture or model to capture and deliver value remains low.

Further, in recent years the increased usage of internet and the possibility of performing business over internet without any physical contact between the seller and buyer have been dominating the indian market. The logistics companies that facilitate the online marketplace has grown. The level of confidence and awareness of online markets among the india consumers are very high. The Internet marketplace are now increasingly becoming preferred choice of place for buying and selling this is more relevant to consumer products (Consumer durables, clothing etc). The ubiquitous internet service in india and

the logistic network to transfer goods remains worldclass in indian sub continent. The rise in internet marketplace have had a profound effect on the way consumer buys goods. The level of confidence in such service and online marketplace is high and thus they have become increasing popular choice for buying. Online market place or internet based companies have indeed threatened the profitability and the very viability of many brick and mortar stores. Even for heavy electrical electronic consumer durable products such as refrigerators and Airconditioners, television set etc are bought by consumers from online market place. Thus successful integration of this development such as online market place have to be effectively used by business model innovation.

Manufacturing entrepreneurs in india have perceptible threat from online markets as it is now possible to get products and services not only from local suppliers or producers but from international producers aswell (Allibaba.com). while there are threats from online market place, one positive indicator is the presence of demand. As the country progresses as the GDP grows positively YOY the demand for manufactured goods in india increases and this affirms presence of demand and market.

Entrepreneurs have to solve the problem of gaining superior returns as they capture the demand and the market. As the prevalent business condition in india is more ideal as there are both opportunities, threats and risks. Manufacturing sector which has cost pressure due to increase in input cost and competition from china have to be more entrepreneurial and innovating in the way they design their business model. The options and opportunities for innovative business model are enormous due the evolving nature of market, improving supply chain and logistic network.

8.3. Methods for designing innovative business models from literature

Business model innovation or to design a new business model is not that straightforward as it initially would seem and indeed some firms spend little time on designing or developing a business model compare to the resources and time spend in developing the products or services. Research has found that the new business models often fail and are not that easy to implement (Sosna et al., 2010). A proper problem formulation is essential for effective and comprehensive business solution. For start ups or new firms who can be characterised by new idea or new product where they have liberty to be flexible in adopting novel business models the challenge is to find the right combination of novel product with novel business model that provides superior return. Having a good product alone will not generate a superior outcome. A wrong business model would generate discouraging results which would threaten the very viability of the business even for the firms with the most promising product or services. Thus for startups it is challenging to come up with a business model that compliments the innovating solution it has hypothesised for the customer needs.

For the established firm the challenge related to the business model is more profound. The existing model would be providing the firm with required returns and value, hence the need to act or innovate a new model might not be realised. But often the business environment in which firm operates is neglected. The business environment is constantly changing, the supply chain disruption are observed to be common. Geopolitical tensions and protectionist measures some developed and developing countries have adopted have effected the supply chain and disrupted the business model of established firms. In addition to these the ever changing technological landscape the customer demands and increased

barriers for superior gains are putting pressure on the existing business model the firms have adopted.

In this section extent literature review is performed to identify exactly how firms perform business model innovation. The various methods procedures and theories that are proposed in literature are identified and studied in this section. The objective is identify the main parameters, theories and concepts that influences modern business models [from 2001 and onwards].

(Amit and Zott, 2012) In their study identified antecedent or driver for business model design. They describe business model as the system of interdependent activities performed by a focal firm and its partners and the mechanism that links these activities with each other. Their theory suggests four design drivers that crucially effect business model design. These four drivers or antecedent for business model design are firms goal to create and capture value, templates for incubents, stakeholders activities and environmental constraints. The first antecedent or driver is to create goals to capture and create value for all stake holders and not only to the focal firm. Emphasis should be given to total value creation and hence its important to understand the individual goals of various stake holders and their goals needs to be balanced in business model. The twin objectives of value creation and value appropriation should be fulfilled in a balanced manner and value has to be for all stakeholders customers suppliers and partners. The second antecedent identified is the template of incubents and others anchored in four design concepts. The first concept is “borrow“ that is drawing inspiration and scanning for other business model implemented, second concept “default“ is tendency to choose efficiency centered design than the novelty

centered. However tradeoff are recommended for selecting between efficiency centered and novelty design. The third concept “recycle“ is the use elements of previous successful business model. Fourth concept is vocabulary wherein designers mindfully are aware of path dependencies, bias and rationality. They do not follow the set vocabulary of concepts, preferences and logic that were developed from experience through time. The third antecedent identified is stakeholders activities which is rooted in the design concept of collaboration with partners who bring unique expertise and insights. This would also promote a complementarities-centered business model design. The fourth antecedent is environmental constraints. Every firm and internal and external constraints which limits its activities and returns. This constraint can be source of creative challenge and a novel business model. Thus (Zott and Amit, 2015) Proposed framework for considering four important antecedents in designing complex new business models

(Ramdani et al., 2019) Performed extensive literature review to identify how firms perform business model innovation. Their observations in the evidence of literature reviewed suggests firms to explore alternate business model through unique experimentation and through open and disruptive innovation, they observe firms should rather take continuous evolutionary process of revision, adaptation and fine tuning of existing business model. Further they found that changing business models consists of modifying a single element, altering multiple elements simultaneously or changing the interactions between elements in four principle areas of innovation which are value proposition, operational value, human capital and financial value. Value proposition the first principle element refers to answering why question. Value proposition considers elements

like rethinking what company sells, exploring new customer needs, acquiring target customers and determining whether the benefits offered are perceived by customers. Established organization should identify the unmet needs of the customer (Job to be done). The second principle element is regarding operational value which answers the what question and it consists of elements like configuring key assets and sequencing activities to deliver the value proposition, finding the various means by which company reaches customers, establishing links with key partners and suppliers. Activities can also be reorganized and reconfigured to reduce transaction cost. The third principle element is regarding human capital answering the who question. The third principle element further consists of four sub elements which are described as experimenting with new ways of doing business, tapping into the skills and competencies for new business, motivating and involving individuals in the innovation process. Organizational learning also is an important aspect of human capital. Governance referring to who performs the activities is also an important element identified of human capital. The fourth principle element is regarding the financial value answering the question how. This includes elements linked with activities like how to capture value through revenue streams, changing the price setting mechanisms and assessing the financial viability and profitability of business. This framework provides a navigation map for managers interested in how to change the existing business model

(Wrigley et al., 2016) In their paper for business model design outline a design process consisting of exploratory experimenting and prototyping for exploring various scenarios and stress testing the viability (and profitability) of the venture and for identifying any unintended assumptions. They illustrated how experimenting and prototyping of

business model can be done using Business model canvas (Osterwalder and Pigneur, 2010). For their study they proposed 5 meta models these models are customer led [Identify new customer group] , cost driven [to reduce and manage cost] , resource led [identifying, restructuring and reapplying resources in new ways] , partnership led [partner creations] , and price led [Price leadership]. They postulate that experimentation using business model canvas provides stakeholders within a company a framework that can stimulate conversation and motivate for exploration and divergence from commonly held assumptions and logics within their respective industry. This type of experimentation practice can foster evolution of business models directed towards search of an innovative, anticipatory or reactive response to changing market environments and business conditions. Further by producing a different variety of prototypes during experimentation implications of different business models for generating a superior outcome can be better studied and understood. This would help the management team to make better and clear informed decisions.

(Chatterjee, 2013) In his article proposed some simple rules to design business model. Article provides a roadmap enabling a firm to choose from four generic business model as their primary focus and then in second step provide a systematic process to consider multiple design configuration and provide decision protocol to choose design that has high probability of success. Second step develops business specific profit logic or the core objectives from generic profit logic. The Four generic model proposed are efficiency based model, perceived value based model, Network Value (Loyalty) model, and finally

Network efficiency model. The rules are proposed for each of the generic models identified and are detailed in their research paper.

(Sosna et al., 2010) studied the antecedents and drivers of business model innovation in a Spanish dietary products business. The study was from a dynamic perspective situated in the organizational learning literature, and emphasized the importance of trial-and-error learning for business model innovation. The dynamic perspective presented considered business model development as an initial experiment. These experiment is which moves forward in the form of constant revision of its parameters, adaptats to new evolving information and fine tune based on trial-and-error learning that happened along the process. They from their study observe that firms begin with a business model and then in response to certain triggers (typically external) plan, design, test and re-test alternative business model variants until they find the best that suits their objectives. Thier study developed a therortical framework which considered not only externalities and environmental contingencies but also the entrepreneur's (manager's) psychological and emotional character that would impact the business model geration. The study also considered the effect of entrepreneurs historical learning, learnings at different levels in the organization (individual, group, organizational) and how this learning influence the way business model is generated. In essence they strongly conclude that the business model generation to be trial and error process with strong emphasis on learning.

(McGrath, 2010) In their paper proposed that the business model should be developed using discovery driven approach rather than analytical approach. Conventionally there is much empasis on analysis or analytical approach instead

experimentation and learning should be adopted. They observe conventional way for planning businesses have a mismatch between the knowledge a firm actually possesses and the knowledge its planning systems assume it possesses and this affects the discovery driven approach. Discovery driven planning processes require business model assumptions to be articulated and tested. In Discovery driven approach the executive of the firm are required to articulate the unit of business for a plan (key business metrics), create a reverse income statement which projects the revenues and profit. Executives also require to define key process metrics that would support the plan together with the most critical assumptions they make. The overall objective is to account the key business metrics and discover the right approach or model as new information is gained. They conclude that due the uncertainty about the how business and competitive forces unfold it is more beneficial to engage in experimentation and discovery than to try to assume the relevant information.

(Wirtz et al., 2010) Proposed strategic method for business model development for internet based firms. In his method he emphasized the need for more metaculously identify the changes in business environment. In their proposal to develop business model they observe that environment impacts different kinds of business models that create value in a given market and such a environment is in constant flux. Firms need to possess strong sensing capabilities to identify the relevant changes in their environments and once these changes are identified the next step should be to match these changes to existing business model and to derive action plan for the opportunities and challenges in the market. They provide a 4C [content, commerce, context and connection] typology framework for managers to gain a highly structured perspective on the key components of their business

model. In this type of framework they identify four fundamental business model that exist in internet based firms and they are, first is content in which the business model provide convenient and user-friendly access to various types of content, the second is commerce this model provide a cost-efficient exchange place for buyers and sellers of goods and services, the third is context this model provides structure and navigation for internet users to reduce intransparency and complexity and finally connection this model provide the prerequisites for exchange of information over the internet. This framework also is useful to identify changes in the environment. After analyzing and identifying the critical changes and trend, managers need to redesign their business model components to align to changes. They need to implement their new structure and new organizational routines that are capable to tackle the evolving business challenges

(Giesen et al., 2007) from their study proposed three ways to innovate business model. These three ways are, innovations in industry models, innovation in revenue models and innovation in enterprise models. These three business model can be used alone or in combination to yield best results. Development of industry innovation model involves innovating in the industry value chain by horizontal moves into new industries. Industry model innovation will involve the development of entirely new industries or industry segments. This particular model generates unique assets and improves the ability of the firm to leverage competence in competitive environment. Revenue model approach involves innovation in methods of revenue generation. This can be done by reconfiguring business value offering like products, services and coupling of product and service along with adopting new pricing model. This model leverages customer experience, their choices

and preferences that can also fuel the need for leveraging new technologies. Finally the enterprise model innovation which involves innovating the structure of the enterprise and its role in new or existing value chains. This dimension focuses on redefining organizational boundaries. Enterprise model innovation can be accomplished via specialization, wherein organizations focus on core competencies or high-margin activities and outsource the rest. Enterprise model innovation can also be accomplished via network plays, wherein companies rely on external collaboration. Based on their analysis they conclude that the proposed three ways for business model innovation can lead to successful financial results.

(Chesbrough, 2010) In his work explored the opportunities and barriers for business model innovation. Barrier he identified are conflicts with existing assets and business models and cognitive ability of managers in understanding these barriers. These two identified barrier can be explained in two business scenarios. Consider in one scenario managers already identify a new business model but the furtherance of this model and further development is inhibited because it conflicts with the existing business model, or there are assets and structure developed to support the existing business model that are difficult to re-configure. The other scenario is due to lack of information and cognitive limitations of business leaders business model is not clear or is not identified. To overcome this barrier he propose that processes of experimentation and effectuation along with successful leadership of organizational change must be brought to practice. In their study they recommend leaders should adopt explicitly an experimental stance toward business model innovation and develop and direct low cost, quick performing and useful

informative experiments that generate valuable insights . Further he proposed to construct maps of business models for elaborating the underlying processes. Experimentation than would be an alternate combinations of these indentified processes. Mapping explicitely and visualizing business process will help articulate and eloborate business models that makes simulation and testing of derivation of alternate business model possible. In their conclusion they observe that companies must adopt an effectual attitude toward business model experimentation. This is because experiments create new data and information and business leaders should be empowered to trigger the required changes and actions.

(Friedrich von den Eichen et al., 2015) In their paper identified barriers for business model innovation, these barriers they identified from their personal experiene and further they propoe some starting points to over come this barriers. The barriers they identifiies are awareness, search, system, logic and culture. For the first barrier awareness the main reason idenfied is the thinking pattern, narrow focus and existing incentives. Solution proposed for this barrier is to analyze on the specific opportunity-risk profiles of the various types of innovation and have clear disctiction in the process and organization structure for product innovation and bussiness model innovation. The second barrier pertains to searching. Narrowly defined internal and external search environment is a barrier, diversified perpectives should be obtained from a more broaden search regions. To overcome this barriers opennes and disciplined networking should be embraced. Search process should be expanded accross enterprise and industry boundaries, whole company should be stimulated for active search, creativity and internal and external knowledge should be used to overcom resource constrains. The third barrier are system related barriers

which essentially stem from bureaucratic issues, lack of transparency and false incentives. Overcoming system related barrier required conscious affirmation and mastering of complexity. Complexity in achieving multitrack orientation that is required to manage conflicts between evolutionary and disruptive innovations. The fourth barrier identified is logic about how an idea or invention finds its way to customers. This barrier can be overcome by thinking and acting in a holistic ways. Barrier can be overcome by understanding the business models inherent interactions between positioning innovative products and services offered, value chain logic considered and market approach adopted. The fifth and final barrier of new business model identified is culture related barrier. Overcoming culture-related barriers entails anticipation and confidence. Finally they conclude that overcoming barriers to business model innovation requires openness, networking and affirmation, mastering of complexity and thinking holistically.

8.4. Conclusion : Implication on business model innovation from strategic entrepreneurship perspective

The Literature review clearly highlights the necessity to experiment or iterative process for business model innovation. Barrier for Successful business model innovation are elaborately found to be identified and explained. For manufacturing firms following guideline can be adopted for generating or altering the existing business model

- Extensive studies performed by (Amit and Zott, 2012) suggest business model should account total value generation for all stakeholders. Balance should be obtained between novel and efficiency based business model. Business model should not be completely efficiency dominated or completely novelty dominated.

- For the existing firms it is recommended to have a new business model altogether rather than having incremental changes or fine tuning of business models. This can be achieved by modifying a single element, altering multiple elements simultaneously or changing the interactions between elements in four principle areas of innovation which are value proposition, operational value, human capital and financial value (Ramdani et al., 2019)
- Business model canvas as proposed by (Osterwalder and Pigneur, 2010) can be used for visualization and developing array of alternate business model. Each business model can be experimented and initial prototypes (Small scale testing) can be tested in real world to gauge the performance of the business model considered.
- Perform thorough Industry analysis to identify the industry segment and select a generic business model. Analysis to understand the value capture logic of each activities along with their objectives. Apply the rules as proposed by (Chatterjee, 2013) to have proto-business model considering the existing capabilities and resources. Iteratively finetune the model and finalize.
- Discovery driven approach where experimentation is encouraged can be useful in emerging market. In this approach assumptions should be articulated and key business metrics should be developed sufficiently articulated. Projected revenue and profit statement should be developed for the business model and benchmarked with the expectations and competition.
- Business models are affected by the changes in business environment which require both investment in research and business development. Routine evaluation of

customer needs and of technological possibilities are required to be carried out. Business model need to be strategically adopted to accomodate these changes. Scanning of opprotunities should extend firm boundaries.

- Create new markets or horizontal shift in the industry structure. Perform high margin activities and outsource the rest. Colloborate and network for information and value. New market segments in different industry category needs to be considered and possibility of application of existing products or service from the portfolio should be analyzed.
- The business model should capture the unmet job or need of the customer for which customer is willing to pay in a way which generats profit to the firm. The capabiltiy of the firm and its managers should be in identification of such unmet needs. The managerial skills and leaderships skills to undentify customer needs for which he is willing to pay or choose a firm above its rival for business should be developed systematically through constant customer interaction.
- Barriers for the business model innovation well documented in the literature should be eleminated or minimized by the leadership team. Leadership team is responsible for development of business models. The key inputs comes from the bottom layers of management. Leaders should be aware of thier cognitive capabilities and the biases that may influence the decisions.

CHAPTER IX:

STRATEGIC FORESIGHT WITHIN STRATEGIC ENTREPRENEURSHIP

9.1. Insight into the nature of changes in ecosystem and business environment

As India and other similar developing countries progress towards development many changes are induced in the society, economy, and political preference of the people. One of the prime objectives of the governments is to improve the GDP, promote local manufacturing and assembly, and lift many people out of poverty. These efforts also improve the quality of life of mid-income-level people. This causes a marked shift in preferences pattern for buying consumer goods, electronic equipment and for manufactured goods. These can be explained by increased demand for high end phones like apple iPhone in India as the affordability and requisite financing infrastructure to fund the aspiration remains available. Furthermore, the demand for cars remains high at all-time, demand for cars with improved features in safety equipment and high-end entertainment functionalities is observed to be increasing. In the energy sector the power plants (Coal based and Gas based) are improving efficiency by shifting to critical or ultracritical powerplants. Demand for industrial automation and automation related equipment is observed to be improving.

At the top level or from the government policy levels there are perceivable efforts to support manufacturing SMEs in MSMEs in India. This support is provided in the form of various financing systems in place, making available government operated import and export channels and making available the government operated marketplaces. Many innovation hubs are being set up in various academic institutes and with industrial bodies to support technological innovation and the possibility of open innovation from SME and

MSMEs. The recent successful example of such a hub is “T-Hub” started by the government of Telangana a state of India. Till 2022, T hub managed to bolster India’s innovation ecosystem. It managed to design and deliver more than 100 innovation programs which enabled 2000 startups to scale nationally and globally by enabling connection of these startups with various influential ecosystem stakeholders [<https://it.telangana.gov.in/>]. The support required from the ecosystem or business ecosystem has been improving for the last four to five years. Similar trends can be observed in other developing countries. For manufacturing sector nations

There are ample positive changes, there are equally challenging and risk inducing factors developing in the ecosystems and business environment. For India rising population coupled to depleting natural resources, food production, affordable housing, and dependence of economy as large on monsoon rains as the economy is hugely dominated by agriculture sectors remains challenging and increased the risk factors in business plans for many SMEs in manufacturing sector. The highly price competitive Chinese goods and other goods imported and manufactured from outside of India poses fundamental challenges to Indian SMEs. This has resulted in protectionist strategy not only by developing countries but by developed countries as well. Protection is induced by imposing tariffs on imported goods and creating other barriers through policy frameworks. Climate change is another factor which is inducing the restriction in usage of materials and the way other resources are being consumed. The new environmental laws are being introduced and new policy changes are initiated on a regular basis to accommodate the environmental protection obligations. The depleting of natural resources induces price fluctuation in the

input cost of the raw materials. The Global competition for resources affects the ecosystem and business environment not necessarily in a positive way. An example being the availability of rare material for manufacturing electric motors. The rare earth magnets for the DC motors used in electric vehicles. Very few countries are rich in such materials and rely on imports. Similar is true for batteries. For lithium-ion batteries the component lithium is not widely available in majority of the developing economies and is in abundant reserve with few countries like China and Australia. These resources, lithium and rare earth magnets thus pose a great challenge for the development of cost competitive electric technologies. The economic framework for financing businesses, which includes interest rates, and availability of sufficient liquidity within the firms for funding growth and research and development activities remains a challenge currently and in the immediate future.

Thus, in the current business environment SMEs must transform into being able to respond to the changes. The risks factors increase while opportunities begin to reduce, and competition reduces the profit margins. Firms cannot operate with traditional competence. Business leaders and managers should have competence in foresight and competitively implement forecasting methods to understand and pick up the weak signals of changes well in advance to orchestrate a proper response. Foresight will also enable firms to be prepared for uncertainties and it will enable management to enact contingency plans in case of sudden changes in the business elements. Strategic foresight and its methods remain a powerful tool that enables managers and business leaders to interpret and manage information about the future environment that the firm plans to operate.

9.2. Introduction to strategic foresight

Today's management has an increasingly more dynamic business environment compared to the management of similar firms two decades ago. The rate of change was still manageable and to some degree predictable. The major challenge for today's business leaders and managers today is to make decisions, formulate strategy and execute these decisions and strategy through various organizational systems that are already in place in and business environment [VUCA environment].

The concept of foresight in context with management have four main characteristics according to (Rohrbeck et al., 2015; Schwarz, 2023) . The first characteristics are multiple possibilities that is there are multiple futures, strategic foresight envisage alternative futures. Second is unpredictability and uncertainty. That is the future is uncertain and unpredictable. The third is drivers for change can be identified and studied. The future is different than the present because of certain changes in the main elements and these changes can be identified and studied. The fourth characteristic is that the future can be influenced. Main element of strategic foresight is the premise that the future is neither predictable nor predetermined. Future can be influenced by the present choices of the organization and other relevant stakeholders in its business (Martin, 1995). In literature there are two main systems perspectives on strategic foresight. One perspective considers strategic foresight as a process and the other perspective considers strategic foresight as capability or organization ability (Rohrbeck and Gemünden, 2011) . If we consider the managerial ability or the personal capability perspective (Ahuja et al., 2005) considered

the foresight definition as managerial ability to predict and managers ability to use the prediction to create actions and strategies for competitive advantage.

From strategic entrepreneurship perspective and considering the strategic foresight within the context of dynamic capabilities the definition provided by(Rohrbeck et al., 2015) can be considered. The definition they provide is as follows:

“Corporate foresight permits an organization to lay the foundation for future competitive advantage. Corporate Foresight is identifying, observing, and interpreting factors that induce change, determining possible organization-specific implications, and triggering appropriate organizational responses. Corporate foresight involves multiple stakeholders and creates value through providing access to critical resources ahead of competition, preparing the organization for change, and permitting the organization to steer proactively towards a desired future.”

It is vital to understand that generating a strategic foresight requires collaboration and involvement of managers and experts from different and many varied functional domains. These personals are the personnel which currently influence the business decisions or in later stages will influence the major decisions the firm has to take. Strategic foresight involves constant interaction among different functional members of the organization and not only that of heads or leaders of that division. Employees are encouraged and motivated to share their opinion and views on emerging environmental changes and their vision for strategic change (Sarpong and Maclean, 2016).

Further the definition of foresight considers identification and perception of changes to be translated into data or information that will make it possible for managers of business leaders to access the impact of these changes on the current and future business parameters. (Hamel and Prahalad, 1996) in their paper consider strategic foresight as technique that provide deep insight into trends in technology, demographics, regulations, and lifestyles. These insights can be further developed or considered to extract and rewrite industry rules and create new competitive space.

Various definition emphasizes that the organizations or firms should be able to have a reaction or actions with an objective to provide response to opportunities or risks that will be induced due to sudden changes. Strategic foresight thus places organizations in a position to take rational and scientific methodology for decision making about the future. The knowledge, insights and the information generated during the strategic foresight provides managerial and leadership team the required rational basis for enacting a quick response to a sudden change. According to paper by (Ansoff, 1975) there are two options for a firm to avoid a strategic surprise that will cause business disruption or threaten firms' strategic productivity. The first option is to prepare extensive capabilities in crisis management. The second approach is treating the problem before the facts about (threats) start to emerge and effectively minimize the element of surprise in the problems occurrence, this approach reduces the problems unfamiliarity, suddenness and need of urgency. Knowledge and information gained during strategic foresight can also boost and facilitate collaborative exploration of new business fields. Strategic foresight concepts help

firms not only to be faster than the competition but improves firms' ability to create new business streams(Rohrbeck and Schwarz, 2013).

Many firms plan for the future or have some plan for the future. There are roadmaps laid to achieve strategic objectives with measurable milestones. Such planning inherently assumes less uncertainty. Thus, planning and techniques used to plan will have to account uncertainty. According to (Vecchiato, 2012) environmental uncertainty has developed two fundamental theoretical frameworks the first one is planning school which argues that as uncertainty increases, organizations that work more diligently to predict changes in their environments accurately will outperform those that do not. Planning a school approach puts more emphasis and importance on systematic analysis and integrative planning. In this approach there is discipline in the scanning of trends, discipline in generation of alternatives and forecasts, there is pragmatic effort for rational evaluation of information and its integration into the firm's existing operations. The second is an adaptive school which prescribes avoiding prediction as much as possible. It focuses on responding to changing events as they emerge. The adaptive school of thought emphasizes continuous experimentation and fast adaptation to changing environments (Vecchiato, 2012). A major identified drawback or opponents of planning school argue that predictions might not be perfect and often time difficult. The proponent of adaptive school of thought advocate for adaptive approaches which avoid trying to define future changes and events and seek instead to position the firm to make timely responses to actual events and changes. Figure 14 shows the effect of two school of thoughts with respect to prediction and control.

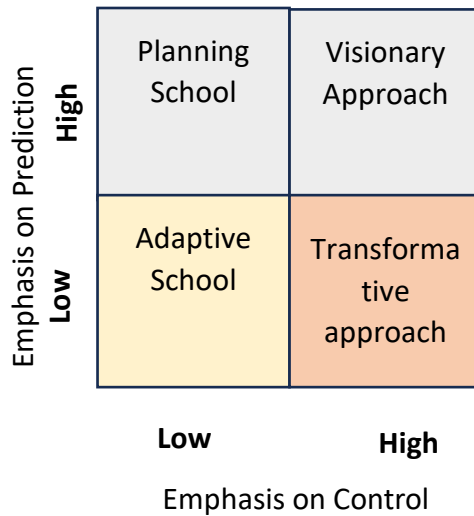


figure 8, Strategic management of environmental uncertainty: Framework of prediction and control. Source: (Vecchiato, 2012).

Strategic foresight enables the firm’s ability to propose a superior value proposition and integrate competitive advantage in its products and services. (Rohrbeck and Schwarz, 2013) in their empirical study find that strategic foresight contributes to firm’s value capture mechanism as strategic foresight enhances firms’ capacity to perceive change, enhances firms’ capability to respond to change, influence other vital business elements through enhancing capacity for organizational learning. Similarly (Ruff, 2006) in his paper describes strategic foresight to influence organizational strategic issues at various levels in five different fields. The fields identified in their paper are long-term market developments, future customer needs, prospective evaluation of innovations, business processes and organizational change, and scanning and monitoring.

An important outcome of strategic foresight is not the prediction of the future but the action points for the firm to prepare itself for the future. Strategic foresight provides the necessary information and indications of the direction of learning process that fosters the flexibility and strategic agility of the organization and it further fosters capability to

respond to changes in the external environment (Vecchiato, 2015). Strategic foresight can be considered as an advanced capability of foresight and more meaning full capability of foresight that a firm's top management and managers should poses. Strategic foresight is a thus strong management construct and effective construct to deal VUCA business environment, to sustain and develop competitive advantage, prepare the firm for the future by enabling better identification and management of risk and position the firm for sensing and seizing future opportunities.

9.3. Strategic foresight and dynamic capabilities

Dynamic capabilities fundamentally consist of capability to sense, seize and react to opportunities and threats (Teece, 2007) Dynamic capability improves firms' ability to respond and shape unknown futures (Teece and Leih, 2016). Dynamic capability argues that the sensing capability of the firm should be able to detect the fundamental changes in the business environment at an early stage so that there is time to build up response to actual external shock. Dynamic capability argues that the firm's transformation or reconfiguration capability is essentially a very important capability which helps firms in rapidly changing environment.

Dynamic capabilities strongly rely on attaining foresight. Foresight is essential to sense the weak signal and interpret this weak signal in the firms or organization context. Every organization or firm do have future or strategic roadmap for its future vision. These plans are essentially constructed utilizing traditional management techniques. However, many research scholar observe and note that the traditional management approaches and techniques are not sufficient or limited in their capacity to cope with an business

environment that is characterized by unpredictable behavior and rapid rates of change (Anderson, 1999; Levy, 2000; Miller, 2003).

Strategic foresight activities enables and facilitate the organizations cognitive capabilities to sense emerging opportunities as well as risks and enable the firm to learn about its changing environment (Rhisiart et al., 2015; Vecchiato, 2015). Few scholars link strategic foresight to dynamic capability with integrating dynamic capacity into strategic foresight definition. For example, one definition provided (Fergnani, 2022) as follows:

“Systematic organization-level dynamic capability to interpret changes in the environment, outline and evaluate possible futures based on these changes, and use information from these futures for the organization’s competitive advantage.”

Strategic foresight provides significant tools and methods to generate information about possible futures which strengthens decision-making capability and brings rationality to decision making process. Strategic foresight strengthens firms’ dynamic capabilities by influencing firms’ strategic flexibility, it provides decision rationality and improves firms’ capacity to respond to sudden changes (Haarhaus and Liening, 2020). Uncertainty in the business environment is present not only in developing countries but also in developed countries. The uncertainty at its very fundamental level is perceived by big corporations and by small corporations irrespective of the technological maturity the organization poses or the market penetration the organization has. Uncertainty prevails in the very fundamental elements of the business environment for all sizes of firms. This poses major challenges for small and medium enterprises in the manufacturing sector. Manufacturing sectors have comparatively high initial fixed asset costs. There is heavy investment in

various production machines and tooling. These fixed assets are by nature inflexible and have limited re-configurability. For example, a product requiring machining will have heavy investment in computer-controlled machining centers called CNC machines. CNC machines can have flexibility in various machining operations but if the manufacturing type itself is changed to casting or forging the CNC machine becomes of no use to this application. Similarly, if there is a change in material type from metal to polymer or even composite these will have a substantial impact on the manufacturing technique. The constraints placed by such a system introduce rigidity in the SME business structure and hence it limits the ability of the firm to respond to changes or to thrive in a dynamic business environment.

It is now difficult for manufacturing firms to possess dynamic capabilities and especially more difficult for SME with limited resources. Strategic foresight will be a powerful method or management construct for SMEs and manufacturing firms to develop dynamic capabilities. Strategic foresight will enable firms to generate meaningful information about the future and rationalize decisions regarding investments in fixed assets with respect to dynamic capabilities. With strategic foresight firms can have an optimized combination of fixed and flexible or reconfigurable tangible and intangible assets.

9.4. Process for strategic foresight and methods for its application

Strategic foresight and its advantages are well documented in literature (Rohrbeck and Schwarz, 2013) Strategic foresight is discipline, that organizations should adopt to gather information and to interpret and manage this information about the future business environment that they will be functioning in. The benefits and the outcome of such a

practice are a superior and a robust strategy. Big corporations and multinationals with their outreach to more superior resources and information are well positioned to practice strategic foresight. Small and medium enterprises, especially in the manufacturing sector, will find it challenging to practice strategic foresight due to the limited capability of their resources. These challenges can be effectively overcome by skillfully following well developed and advocated methods by leading researchers and consultants in the foresight domain. The tools developed in an academic setting with the adhering to scientific development practices and tested in actual or real-life business settings will be valuable in enhancing foresight capabilities or even enabling practice of foresight for small firms and SMEs. The available methods and tools are required to be understood in the context of SMEs, their ecosystem, and their business environment.

The current section identifies the important academician, researchers and practitioners of foresight and strategic foresight. Their proposed methods will be elaborated and mentioned in this section. These methods will then be considered in SMEs and especially in context with the Manufacturing SMEs.

Jan Oliver Schwarz in his extensive research in the field of strategic foresight have published extensive literature that provides deep insight into the practical application of strategic foresight as a practice or within business routines. The proposed methods and tools are widely applicable across multiple business domains and across business scales. In his book on strategic foresight describes extensively the nature of practice and methods and tools that can be implemented for adopting strategic foresight. In this section briefly the methods and tools are reproduced and further considered in the research context

The process of strategic foresight according to Jan Oliver Schwarz consists of four distinct phases or steps. These are Perceiving, prospecting, probing, and transforming. The process is best illustrated as shown in the figure 9

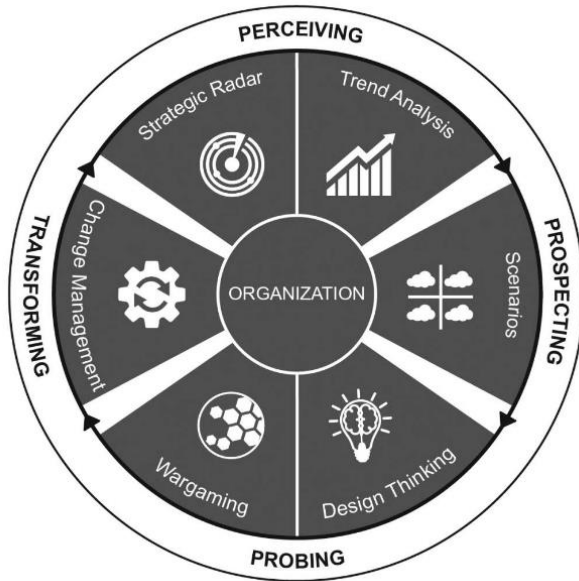


figure 9 Strategic foresight process, source: Strategic foresing,

Perceiving: The first step is perceiving. In this phase the firm aims to identify environmental changes, in this phase firms try to identify weak signals and trends before the competition identifies. When there are discontinuities in any process there are weak signal meaning well before such discontinuities emerge. Such discontinuities present strategic surprises, such surprises disrupt vital parameters of business and may have potential to endanger the strategic objectives of the firm. To avoid such surprises or to be prepared for such events it is vital that firms have a process in place for perceiving such weak signal when they start to occur. Weak signals are detected by scanning the organization environment, which can be done by concept called environmental scanning. The concept of environmental scanning is well explored by (Aguilar, 1967; Boyd and Fulk,

1996; Daft et al., 1988; Slaughter, 1999). In environmental scanning organizations perform systematic scanning for tracing weak signals and trends. Environmental scanning is reported to have two methods. The outside in method and the inside out method. In the outside in method a broader and comprehensive scanning is performed (360-degree scanning). Through this method the objective is to capture all the details and information and not neglect anything. This process thus generates extensive and large amount of data and may turn out to be time consuming. The second method is inside out. In these methods more focused scanning in the predetermined fields or domain is performed. The domains and fields are identified by top management in advance. By these methods the information is limited, but there is risk of blind spots, as some information may be missed due to more concentrated focus only on specific fields.

Prospecting: Prospecting phase is the second phase after perceiving. In this phase firms analyze the information from the previous e perceiving phase. In this phase firms perform activities like sensemaking and strategizing. The information gathered must be seen and sensed in current and future business context. In prospecting phase scenario planning or futures literacy laboratories is practiced. Scenario planning is process which enables managers to experience the future ahead of time by creating so called memories of the future in the minds of the manager which then subconsciously guide the managers to make sense of incoming environmental signal and to act on them (Bradfield et al., 2005). Future literacy laboratory based on theoretical concept of futures Literacy (Miller, 2007). Future literacy laboratories consist of three principles they are action learning, collective intelligence or knowledge creating process and third framing and re-framing futures.

Action learning is learning by doing activities. Action learning comprises of large number of participants who produce their own version of the future with their assumptions. In collective learning or intelligence is practice as learning is more when done in teams or with multiple members. In this process the participants create meaning together. The last principle is framing and reframing. This process takes participants in various frames of the future such as likely or unlikely and desirable or undesirable. There are many ways for reframing the future. Prospective phase aims to gain an insight advantage which would permit the firm to identify a superior course of action that is different from the status quo of the industry.

Probing: Probing phase is a phase where organization tries to identify new courses of action with strong reference to the information from perceiving and probing phase. Probing phase contains research and development projects, rapid prototyping, consumer tests, internal and external venturing, and strategic initiatives. Probing phase consists of tools such as business wargaming and design thinking. A business wargame is a role-playing simulation of dynamic business situation (Kurtz, 2003). It involves several teams representing key stakeholders such as competitors, customers, and governing bodies. Business wargames evolve over several moves which represent a defined period or a scenario. This period or scenario consists of pre-researched reviews, trends, and hypotheses for industry. Business wargaming can be conducted at the strategic, operational, and tactical leadership level and address questions within a context such as strategy testing, foresight, crisis management, or training. The second key activity that can be considered in the probing phase is design thinking. Design thinking consists of three process steps:

inspiration, ideation, and implementation (Seidel and Fixson, 2013). Design thinking can be considered as a human-centered innovation process which emphasizes aspects such as observation, collaboration, fast learning, visualization of ideas, rapid prototyping, and a mix of analytical and intuitive thinking. Design thinking is an integrative framework which successfully brings together creative and analytic modes of reasoning while accompanied by a process, a set of tools, and techniques (Liedtka, 2015). Probing phase main objective is to identify and initiate the main course of action will position the firm and organization superiorly than the competition. It aims to achieve a competitive advantage.

Transforming: Transforming phase is the last phase in the systematic practice of strategic foresight as developed by Jan Oliver Schwarz. In this phase organization practices activities which enhance firms' capabilities to combine reconfigure organization tangible and intangible assets.

The four distinct phases explained earlier are from the works of Jan Oliver Schwarz. A similar systematic process for implementing strategic foresight was developed and proposed by Ozcan Saritas and Sarah Cheah (Cheah et al., 2019). They developed Systemic Foresight Methodology (SFM). The process of the SFM is methodology which brings together divergent and convergent methods with exploratory, normative and action-oriented thinking. The process is represented with 7+1 "I"s. The first seven "I"s represent the flow of the process with a set of consecutive steps, while the eighth "I" represents the participatory character of foresight:

- a) **Initiation (Scoping):** Initiation phase of SFM is scoping of the foresight exercise. Boundaries of the foresight exercise are determined in this phase. Major decisions are made on the scope and coverage of the activity.
- b) **Intelligence (Scanning):** This phase typically identifies and prioritizes important issues and uncertainties, which will shape the future. The aim of this phase is comprehensive analysis of systems and situations for this both environmental and horizon scanning activities are conducted. The objective of this phase is to identify trends, weak signals and drivers of change and new signals of emerging developments, wild cards/surprises/ shocks, and discontinuities (Saritas and Smith, 2011). A PESTEL framework is commonly used to scan a wide variety of issues in political, economic, social, technological, environmental, and legal systems.
- c) **Imagination (Scenarios):** creative and innovative phase of SFM where future-oriented divergent thinking is applied to explore alternative futures. The input generated from the intelligence phase is synthesized as future narratives in the form of scenarios and models of the future. Qualitative and quantitative methods such as scenario planning, modelling, gaming, system dynamics and simulation are used to help explore alternative futures and make assessments of their impacts.
- d) **Integration (Setting priorities):** In this phase alternative futures are appraised, normative visions are articulated, and priorities are identified. This process involves a thorough analysis of the scenarios and models developed in the previous phase. The product of this phase is an agreed model of the future, which will imply the targets to be achieved within the time horizon set for the foresight activity.

- e) **Interpretation (Strategies):** During the Imagination and Integration phases the question of “where we want to go” was answered. Hence, the Interpretation phase has the function of filling the gap between where we are and where we want to go, with a question of “how to get there”. The gap between the future and the present is filled in this phase by suggesting transitions and transformations needed in the long, medium, and short terms.
- f) **Implementation (Actions):** This phase of the SFM is concerned with the actions, priorities, strategies, and follow-up steps are outlined and communicated with the key actors and stakeholders. The aim is to inform present day decisions concerning immediate change actions to begin structural and behavioral transformations.
- g) **Impact (Evaluation) with a continuous:** In this phase foresight is evaluated and embedded to understand the extent the activities have achieved their objectives, the impact generated and the further activities that should be laid out to move forward. This phase examines the impacts of foresight during the process of implementation (e.g. It impacts production of baseline reports, it impacts how articulation of vision is done, and how new linkages are built), immediately after the completion of the activity (e.g. new integrated projects and programs), and sometime later (e.g. innovation impacts and new working communities)
- h) **Interaction (Inclusivity) across the process:** This phase emphasizes the need for effectiveness and efficiency in meeting the stakeholders’ expectations and sustainable use of resources, and therefore, aims to develop mechanisms to provide

engagement of system actors ranging from policy makers to industry, research to higher education, as well as associations and NGOs among the others.

9.5. Details of tools and methods for practice of strategic foresight

Foresight as a practice is in some small measure practiced across all fields. Whether it is in politics, economics, Science and technology and business. There are hardly any organization or small firms who would not have some kind of foresight for their respective fields. Individuals, whether managers or top leaders have their foresight in proportion to their cognitive ability. Organizations indeed are engaged in planning for the future, from creating vision that they want to achieve, developing a roadmap, and developing strategies to achieve the vision and objectives of the organization.

Strategic foresight differs from normal foresight. It differs fundamentally in the elements, factors, and context. Strategic foresight requires extensive methodology to develop an understanding about the future. The world and the business world are getting increasingly complex. Technology changes are now more rapid. Challenges are increasing in businesses' core elements. There is a new increased awareness of climate change and the factors that influence climate change. Pollution, whether air, water or land, is increasing. The manufacturing sector is the core of such problems. Manufacturing whether medicines (Pharmaceutical products), Energy production (Coal and gas based), automobile production, automobiles, and machinery itself are now prime concerns for increasing the pollution levels worldwide. This is resulting in restriction in using specific materials and policies for controlling or limiting pollutants. All these aspects manifest as challenges at many levels for organizations and firms in manufacturing. The necessity and requirement

for implementing and practicing advance management constructs was earlier felt by bigger and more technology-oriented organizations the current business scenarios and challenges in the prevailing business ecosystem warrants application of strategic foresight concept to be implemented and practiced by even smaller firms. This would enable them to develop rigorous strategies to cope with the challenges and changes. Companies should be able to detect changes, develop a future possibility and should be able to enact a plan to align with changing business conditions and environment.

To practice strategic foresight certain methods from leading researchers are reproduced here. Methods considered here are not theoretical or academical in nature but are practiced by leading organizations. Strategic foresight methods should pose certain characteristics and understanding the characteristics of each method is important to understand the application of the various methods in different phases of business. (Popper, 2008) in his paper describes various methods to select foresight methods. Rafael poppers work is heavily referenced for understanding the various methods. Popper through extensive surveys and research found the fundamental attributes of foresight methods and their linkages to the core phases of a foresight process. According to popper there are two fundamental attributes of foresight methods, and they are nature and capabilities. Nature attribute is characterized as qualitative, quantitative, and semi quantitative. Qualitative methods are methods which provide meaning to events and perception. Quantitative methods generally measure variables and apply statistical analysis using or generating at least in theory reliable and valid data. Semi-quantitative methods are basically those that apply principles to quantify subjectivity, rational judgements and viewpoints of experts and

commentators (Popper, 2008) . The second attribute referred to by popper is regarding the methods capabilities which refers to ability of the method to gather or process information based on creativity, expertise, interaction, and evidence. Popper considers this attribute as building block of foresight diamond as shown in figure 17.

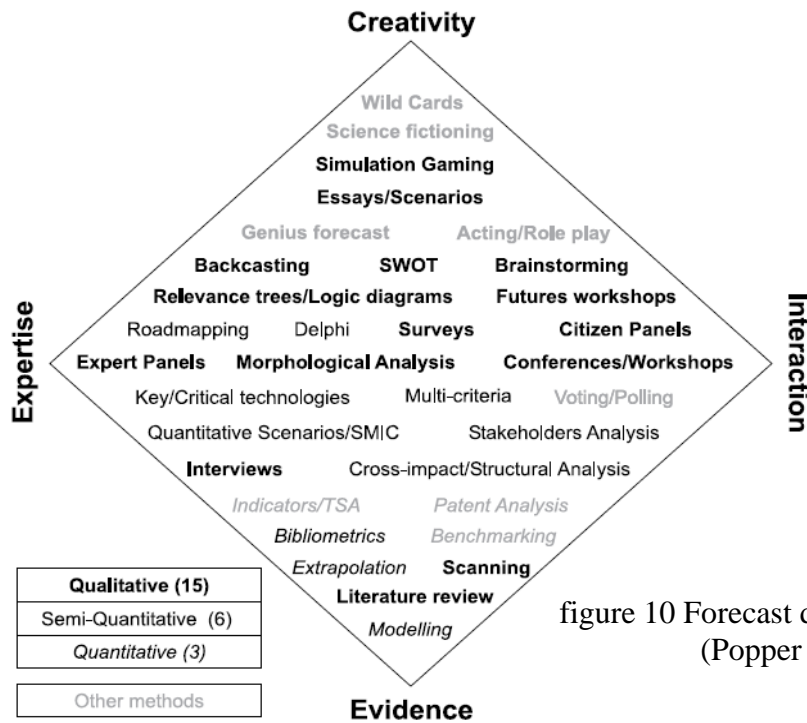


figure 10 Forecast diamond. Source: (Popper 2008)

Based on the popper’s attributes and through extensive literature review Jan Oliver Schwarz identified widely practices strategic foresight tools. Schwarz proposes tools for various process stages of strategic foresight. In the first process stage of which is perceiving consists of weak signal and trend analysis, science fiction and trend receiver. In the second stage, which is prospecting the tools considered are Delphi method, scenario planning and future literacy labs. In the third stage, which is probing business wargaming is considered. In the final stage transforming tools like open strategy is considered. Each tool with respect to the process is highlighted in figure 11.

Weak signals and trends are the basis for any foresight activity and therefore are discussed here in the phase of perceiving. Along with this discussion, I will highlight the relevance of applying science fiction and trend receiver.

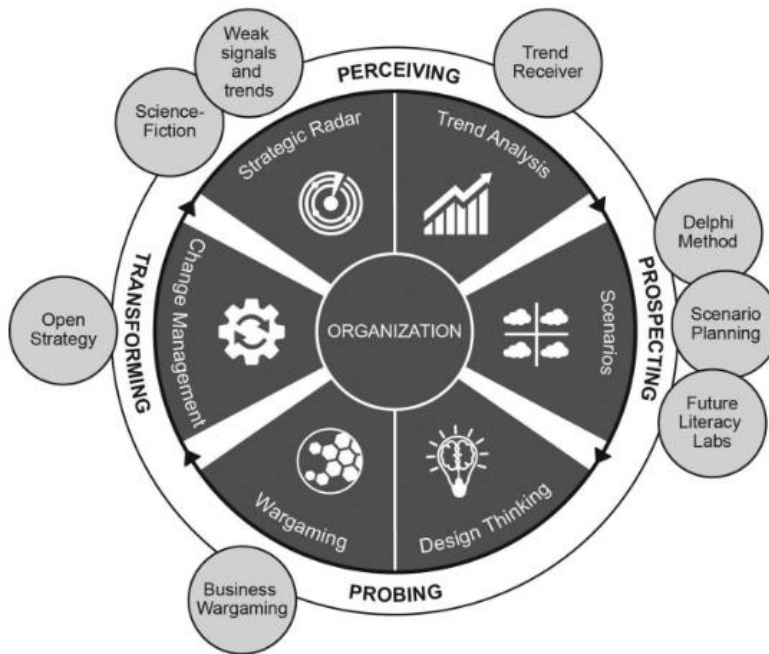


figure 11 Tools for strategic foresight process wise.
Source: Strategic foresight, Introductory guide to practice jan oliver shwarz

9.6. Perceiving: Weak Signals analysis, trend analysis and science fiction

9.6.1. Trend and weak signal analysis

Trends can be considered as socio-cultural innovations. Trend analysis is innovation research or the science of the new (Liebl and Schwarz, 2010). New in context of cultural economy can be considered as objects or concepts that are transferred into another context (Groys, 2008). Strategically trend analysis will consist of two aspects of innovation these two aspects are invention and diffusion. Trend analysis then tries answer the question as follows:

- Identification of new and what will constitute new? [Invention]
- Will the “new” become widespread [diffusion]

Trends is not something that is not something that is widespread, trend and its qualities must be identified and evaluated. Profile of the trend must be outlined, or the line between normal and abnormal must be established. Therefore, trend analysis is an effort to detect abnormalities and understand the drivers that will make the abnormal normal.

Trends analysis is the search of new. New is not something that did not previously exist, but it's something that has changed its context and some sense is starting to emerge for it in the different context now or there is a different interpretation. According to (Groys, 2008) the fundamental characteristic of the new is the fact that objects or concepts are transferred into another context. The invention therefore is transgressing the boundaries of contexts, by connecting hitherto separated contexts. The ability of a firm to perform trend analysis is vital to read the pattern in customer preferences and direction of technology developments.

Weak signal analysis is analysis of signals which are indicators of gross, unstructured, fragmented, incomplete, and inadvertent environmental data. This data can be refined into valuable information and further developed for strategically actionable knowledge. Weak signals are advanced indications of a phenomenon that is changing. Detection of a change at the onset of the change is important, that is earliest detection of change is necessary. The early indicator of change is not obvious or there is no single signal or information that indicates initiation of change instead there are multiple signals from different sources and these data and information must be compiled. There is never a direct indication of the onset of change, but the signals are stronger at the later stage. Competitive

advantage, opportunities or threats are detected when the firm's ability is increased in detection of weak signal of change in its earlier phases.

Ozcan Saritas and Sarah Cheah (Saritas and Smith, 2011) describe three practical and effective methods for trend and weak signal analysis. They recommend performing literature reviews, patent analysis and data mining. Literature review, like academic research, is the process of identifying, evaluating, and interpreting the existing body of recorded documents. Once the topic has been identified or field for scanning has been identified literature review will provide some indication regarding trends and weak signal of change. Patent analysis Patent analysis is the process of reviewing large volumes of patents to identify certain key characteristics, patterns, and trends. Patent analysis will help in technology management for the future. According to (Kayser and Blind, 2017) data mining consists of four steps. The first step is selecting the data sources, second transforming the data into computer language for processing, thirds step is analysis of data using statistical or data mining methods and final step is applying domain knowledge to interpret the results in the context of foresight process.

9.6.2. Science fiction

Science fiction is a recommended as tool to understand the socii-cultural perceptions. Socii-cultural perception of the people are good indicators of the probable acceptance level of certain technologies and products that are not existing but have been conceptualized in literary works. The social construction of reality is based largely on cultural products such as literature and movies (Czarniawska, 2006) . Science fiction movies or literature like novels conceive or imagine products and things that do not exist or may even be well

outside of the realm of scientific possibility. The fact that science fiction is enjoyed and most importantly accepted by majority of the classes itself is itself a remarkable indicator of the mindset of society. This is because literature (and in many aspects movies) both influence and reflect society. Many social messages in India are indeed transferred in the form of short plays. The recent science fiction movies depicting imaginary possibilities with engineering and scientific fields not only entertain but fuels the imagination and this imagination further becomes source of creativity. Such influences from literature or movies generates desire for such technologies among its readers or audience. (Kirby, 2010) describes how film makers and science consultants create cinematic representations of technological possibilities which in effect stimulates the desire for these technologies among the audience. In an article in Harvard business review (Peper, 2017) observes that business leaders can expand their mindsets and envision new futures by reading more of science fiction. Science fiction presents plausible alternative realities, it empowers its readers to confront not just what he thinks but also how he thinks and why. Science fiction helps reveal how fragile and limited the status quo is and how malleable and shapable the future can be. Science fiction does not predict the future or tries to comment or observe anything about the future, what it does is that it reframes our perspective on the world (current world). companies like Google, Microsoft, and Apple have even brought in science fiction writers as consultants (Peper, 2017). Science fiction novels can provide a new frame of reference for managers. Such narratives can be pointers for researching weak signals and trends and further identifying corresponding business opportunities.

9.7. Prospecting: Delphi method, scenario planning, and future literacy labs

9.7.1. Delphi method

The Delphi approach has been used extensively to forecast the probability and timing of future realities by inviting the experts to provide their perspectives. Delphi methods is a method for structuring a group communication process so that the process is effective in allowing a group of individuals to deal with a complex problem (Linstone and Turoff, 1975). The Delphi method was developed in the 1950s by researchers at the American RAND (Research and Development) Corporation. The Delphi method involved inviting experts and recording their responses. These responses are then compiled and shared with the same respondents to allow them to change their perspectives considering the views of others are now available. The process is iterated till their convergence of responses towards one forecast. A Delphi research design has four core elements anonymity, iteration, controlled feedback, and group response (Beiderbeck et al., 2021). Anonymity in Delphi methods is that the participating experts are not known by names to each other. This is done to avoid negative psychological effects such as a tendency to agree with a renowned or popular expert, following majority and political biases. The third element is iteration, which is Delphi studies are iterative. Starting with the first iterations where experts list relevant topics, in second round experts provide ratings and arguments for their evaluation and assessment. In third iteration experts see each other's assessment and views and they re-assess their view. Further iterations are like third, the iterations continue till there is convergence of opinions or till a uniform view about the future is formed. Delphi method is a powerful method. In the constituents of the team experts are important and the results will depend upon how the experts are selected and considered for

the survey. Organizations and firms must choose the relevant experts carefully. Topics for the survey can be formulated questions are essentially future oriented or projection in the future. Delphi method of research or survey is thus very effective method in probing the future with experts. It is efficient in extracting a pure response as it is effective in reducing biases, individual sentiments and negative personality traits of the experts involved. The converged view by this method thus will have certain confidence involved.

For SME to follow Delphi method experts can be sourced internally as well as from external industries or academia with sufficient knowledge about the industry domain the firm activates in. Many domain experts and consultants are available that can be sourced economically for such activities. This will help bring external perspective to the firm's existing functioning and future functioning. The limitation in capabilities and expertise should honestly be reviewed by the firm's top management. Composition of the group is vital to derive a meaningful output from Delphi analysis and hence the experts must be chosen accordingly.

9.7.2. Scenario Planning

The concept of scenario planning was pioneered by Royal Dutch Shell in the 1970s to complement traditional forecasting tools, to enable the organization to respond more effectively than its competitors to the 1973 oil crisis (Cheah et al., 2019). Effective and creative strategies can be formulated if most likely, most challenging, and most desirable future states can be envisioned (Bezold, 2010). Scenarios are essentially stories describing future events to help organizations understand in which possible ways the future can unfold and thus provide inputs for strategy development. The concept of scenario planning was

pioneered by Royal Dutch Shell in the 1970s to complement traditional forecasting tools, to enable the organization to respond more effectively than its competitors to the 1973 oil crisis (Cheah et al., 2019). Kees van der Heijden, a former head of the scenario planning team at Royal Dutch Shell described scenario planning as the ‘art of strategic conversations which emphasizes the relevance of managers having conversations on trends and weak signals developing in their business environment. Managers further analyze ask questions and contemplate together about the implications of these changes for their organization (Jan Oliver Schwarz, 2024).

According to (Meissner and Wulf, 2013; Schoemaker, 1995) scenario planning will be conducted in four main steps. The first step is establishing scope identify core problems and stakeholders and set clear achievable goals. The second step is performing analysis of perception that captures feedback from stakeholders in two or more rounds. Feedback is solicited from both internal and external stakeholders on their assessment of how political, economic, social, technological, environmental, and legal factors can potentially impact on organizations performance so as develop a holistic view of the future. The third step consist of analysis of trends and uncertainty. This is done by compiling and evaluating factors that define relevant future trends obtained from interviews of experts and by computer aided modelling for factors analysis. Part of this phase is to differentiate between drivers and key-drivers among the identified trends. Key drivers are those trends that are both impactful and uncertain. The fourth step involves building of scenarios based on the two key factors identified in the previous steps. These two key uncertainties with their polar outcomes form the basis for the scenario matrix. Four quadrant matrix containing

extremely positive and extremely negative outlook of key uncertainty factors is developed, this process is followed by developing an influence diagram describing the stories or narratives of each scenario that was generated. Implications are derived in this process. In this phase conversation and questions are encouraged regarding the preferential future scenario, preparedness of the organization for the best and preparedness of the organization for challenging scenarios. These scenarios form input for strategy development in strategic foresight methods.

Scenario planning in context with SMEs and Strategic entrepreneurship is an important tool. Scenario planning not only provides inputs for strategy development but influences business model and digitization strategy. Scenario planning practice will enable managers to be prepared for the future opportunities and challenges and provide time to develop resources and competence.

9.7.3. Future literacy labs:

The future does not exist in the present, but it affects the present. The form in which the future affects the present is through “anticipation”. The integration of future in the present takes place through various anticipatory systems and process and this is the foundation for capability for defining and exploring the use of future and is called as Future Literacy (Miller and Poli, 2010) . Design of Futures Literacy Laboratories is shaped by three major principles complexity theory, learning theories, and the theory of anticipation. (Fuller, 2017; Miller, 2018; Poli, 2014).

Developing the frames of the future by anticipating is effectively framed in future literacy concept. In future literacy laboratory learning is accomplished by learning-by-

doing activities. In this step a large spectrum of participants shares their individual images of the future and their underlying assumptions and in the process, participants learn a variety of ways to use the future. Learning can be done more effectively together. Multiple images can be generated and connected by participants and then these images or frames connected as a group.

Future literacy laboratories consist of four distinct phases (Jan O'Liver Schwarz, 2024). The first phase is the “reveal” phase. In this phase participants reveal their images of probable and desirable futures in specific time horizons. This phase contains some elements of trend analysis, forecasting, and visioning for images of future in present with their assumptions. Phase 1, which is ‘reveal’. In this phase efforts are made to work with the participants’ expectations and hopes about the topic under investigation. In this phase participants reveal their images of probable and desirable futures at a specific time horizon. Phase 1 combines classic elements of trend analysis, forecasting, and visioning, with the purpose of revealing the anticipatory assumptions that led to those images in the present. At the end of this phase, it is possible to discuss the assumptions about the topic that had become visible (or revealed) including their possible sources. Phase 2 is the reframe phase. In this phase participants imagine the future of the topic from a different and distinct frame than the one revealed in phase 1. Participants’ ability to handle uncertainty is improved when they experiment with different sets of anticipatory assumptions. In this phase alternative futures are either provided externally by moderator or the participants develop themselves. Phase 3 is the rethink phase is phase where participants re-assess and try to frame their probable and desirable future in the light of new information, challenges, and

perspective they gained from previous phases. Phase 4 is the acting phase. In this phase participants try to contemplate the next action plan following the information and insights gained. These may lead to prototypes or tangible projects. Together or in a group might perform exploratory research to evaluate their findings. In this process a consensus is sought to be achieved.

Future literacy practice enables firms and managers to be equipped with skills to use the future more thoroughly and effectively in the present. Practice of future literacy laboratories will lead to better understanding of the anticipatory system, stronger association between organization members due to collective learning, better understanding of new opportunities and challenges, new sense about the present and the future and will equip organization to be more effective in implementing novel strategies. In SME context future literacy laboratories should play a vital role in strategic foresight development process. The size of the organization and the number of participants will be controllable and manageable for future literacy exercises. Collective participation will broaden the spectrum of input and suggestion. Collective learning and developing knowledge will help the managers to build cohesiveness and a responsive team for strategy implementation and when strategy is tried to be driven by the team.

9.8. Probing:

9.8.1. Business wargaming

Strategic foresight is essential for developing effective strategies in an uncertain business environment. Various methods for developing foresight have been presented in this chapter. An important aspect in all the methods was the underlying assumption about

the availability of cognitive capabilities of participants involved in various foresight activities or processes. Scholars have identified this and many reported that the mental cognitive abilities for failure to develop appropriate foresight (Bazerman and Watkins, 2004; Liebl and Schwarz, 2010; Schoemaker, 2004). Many organizations fail to recognize trends and weak signals or ignore the signals and trends. The major reason attributed to this miss is the mental models of firms and organizations which lead to rejection of the perceived signals. Mental models as defined by (Schwarz, 2006) are deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world and how we act.

Business wargame is one the technique developed which overcomes many barriers and the “mental model” barrier described earlier to develop a foresight. In the business wargame participants are forced to think ahead, to evaluate their predictions and to question their mental models. Business wargame forces stakeholders to analyze the future dynamics of market or industry by simulating the future. This helps managers to experience the dynamics and the competition in their market or industry and to see the consequences of their strategy. Business wargame forces managers to assume other roles than the one they have like competitor or stakeholder and then use the dynamic and complex nature of business wargame to challenge their perception. Business wargames create settings in which mental models of the participants are tested or challenged which may result in more appreciation and acceptance of ideas which otherwise would not have been acceptable.

Wargames initially were practiced by military personals to test their plan and strategy. The tenets of the process are then further developed for the application of the

process to business scenarios.(Kurtz, 2003). Describes business wargames as a role-playing simulation of a dynamic simulation which involved a series of teams each assigned to assume identity representing an entity with a stake in the situation. War games will be enacted in different rounds representing different time periods such as months, quarters, or years they might also represent different phases of product lifecycle. Wargame can represent different firm activities like acquisition, preparation of winning an order or any other firm level ventures. According to (Kurtz, 2003) a leading consultant in business wargames following are the few characteristics of business wargames:

- It involves deeper and intensive participation of all the members involved. There are members divided into five to ten teams each representing distinct stakeholders like market, key customers, different competitors, suppliers, strategic partners and channels and regulators. The teams and its members then assume the role of the entity.
- As development and assessment of strategies starts to unfold during the roleplaying cultural issues, egos and other subjective factors begin to appear. The interaction basis now is not only on quantitative data but also on subjective factors.
- In business wargames there is rigorous analysis and testing of a situation from different perspectives. By appreciating alternative perspectives and sometime hostile perspectives the group or participating organization starts learning to recognize opportunities and threats.

Business wargames according (Schwarz, 2009) enables participants to discover weak signal, develop a foresight, enables firms to identify the weakness in their strategies and facilitates testing of strategies before implementation which further enhances firms or organizations provisional skills. Business wargames thus prepare the organization for opportunities and crisis. Business war games will aid developing foresight by first providing or identifying weak signals and trends and then interpreting these signals or information in context with dynamic simulation. Strategies can be developed and tested during the simulation games and the reaction of various players can be further studied to improvise the strategy. Business wargames thus is a powerful tool even for SMEs with limited resources. The ability of the business wargame to utilize or combine the cognitive abilities of various stakeholders is more relevant in context with SMEs. Cognitive ability of a group combines will generate more output than the individual managers or leaders' cognitive ability in context with strategic foresight development process.

9.9. Transforming:

9.9.1. open strategy

Transformation is the last phase of the strategic foresight process. In the process which were perceiving, prospecting, and probing many activities were performed collectively and almost all levels of personnel were involved. In scenario planning the group collectively tried developing a different frame of the probable future. In business wargames there were teams comprising of different functional personnel within the organization. The tools described herein for developing strategic processes essentially consisted of deeper involvement of managers, experts, leadership team and other personnel

within the organization from different hierarchies. The process itself promotes learning together, developing foresight together and the process promotes dispersion of knowledge and information gained during the various workshops and programs like scenario planning and business wargames.

Open strategy is a process where the development of strategy process is carried out by involvement of all levels in an organization. Open strategy leads to the inclusion of multiple perspectives with the potential for achieving innovation or challenging mental model due to involvement of participants from diverse backgrounds, hierarchical levels, or functions within an organization (Schwarz, 2020). Open strategy described as (Whittington et al., 2011) is a strategy development process which exhibits openness in terms of inclusiveness, involving range of people in making strategy, and an openness in terms of transparency, both in the strategy formulation stage and, more commonly, in the communication of strategies once they are formulated. According to (Whittington et al., 2011) Open strategy constitutes a dynamic bundle of practices that allows strategic transparency. Open strategy includes internal and external actors going beyond senior management and their immediate advisers.

Further they describe the benefits of open strategy as follows.

- The inclusion of broader stakeholders results in greater dispersion of learnings, information, and knowledge in the strategy formulation process.
- Since all levels involved there is better understanding of the strategy, its underlying assumptions and rationale which improves the degree of implementation and effectiveness of communication.

- Improved acceptance of the strategic decision by greater number of people within organization
- Identification of relevant strategic talents within and outside the organization

9.10. Conclusion: Strategic foresight is a powerful tool for developing dynamic capability

To be prepared for the future, foresight about the future is necessary. Strategic foresight is a structured and widely practiced method for developing knowledge about the future. Strategic foresight contributed to all three elements of dynamic capability. It improves the sensing capabilities of the organization. Exercise such as trend analysis weak signal analysis horizon scanning, and trend receiver help develop knowledge about the future. Rigorous exercises like scenario planning and business wargaming help in probing of the received knowledge a little deeper. Thus, preparing the organization for seizing.

In manufacturing sector and particularly SMEs can benefit from Strategic foresight in developing dynamic capabilities. Development of dynamic capabilities is difficult in manufacturing setup due to inherent high cost or high capital investment in tools, machines, and workshops. Further the time required to gain competence and skills is more. The learning process is costly and lengthy. There are multiple business constraints that increase rigidity and limits flexibility and agility. This results in limited reconfigurability to align to changing business landscape. To gain flexibility, constraints must be relaxed or omitted. Strategic foresight will help in reducing the constraints by generating the requisite knowledge, information and learning about the future.

Strategic foresight will provide vital inputs to develop dynamic capabilities. Knowledge information and learning from strategic foresight will enable manufacturing firms' investment into appropriate manufacturing systems, tools, and methods. It will enable firms to upskill and train their personnel well before actual need. Strategic foresight will provide the necessary lead time to train and gather skills, expertise and knowledge regarding the future requirements. Tools such as trend analysis which involve technology trend analysis as well will help top leadership to discover new opportunities and threats of the future. Strategic foresight will enable firms to accelerate or decelerate in exploiting opportunities considering profound insights and knowledge of the future business environment.

Strategic foresight emphasizes collective exercises for using various tools like scenario planning, business wargaming, future literacy labs and open strategy. For small firms this builds cohesiveness and improves the strategy execution of the firm resulting in improved competitiveness. The collective efforts to appreciate the future through strategic foresight set the stage for the different personnel at different hierarchies to identify new opportunities and probable threats to existing business in the near future. This adds to intangible capabilities of the organization which are flexible and thus fully fill the requirement for having dynamic capability (Re-configurability).

CHAPTER X:

DIGITILIZATION IN STRATEGIC ENTREPRENEURSHIP

10.1. Digitization in Manufacturing : Strategic Decision

Manufacturing is one of the important and vital activity the firm performs. Manufacturing performance and capabilities greatly influence the strategic decisions of the Small and medium manufacturing firms and start-ups in manufacturing sector. Manufacturing performace also have direct influence on the company bottomline, perceived product quality and performace of the product itself thus the decision related to manufacturing can be considered as organizational level decision and not at individual division level. This can also be understood from the decision of henry ford to start automobile production line for mass manufactring or production of automobile during early industrial age. From Product design and development perspective majority of decisions are centered around the engineering and technical performance of the product. Research and Developmets also centers their decision around the product specification and performance. In cost sensitive market and especially in emerging market the performance of a product or service for customer may take secondary preference and the primary preference would be cost. The performace criteria is competitve criteria of selection with the alternatives available. The cost of the product has major chunk of manufacturing cost.

The henry ford model (Chandler, 1990; David Teece, 1993; Zysman John, 2003) or (the fordist model) of manufacturing was followed for much of the nintheenth century, in this model large hierarchical conglomerates were formed to exploit the economies of scale and scope , functions such as production design, research and development and operative

functions were separated and controlled by the general management, Manufactured product and services were pushed into the market by effective marketing of this standardized goods and services. Later this mass production model was challenged by more flexible Japanese lean production model. with demand-based just-in-time logic challenged the rigid received view of a manufacturing firm. The core companies of this production model are vertically less integrated. This model tightly links the individual supplier companies who have their own high-powered incentives and R&D activities to the core companies and to their clients as well (Zysman John, 2003) Disintegrated but tight structure of the Japanese lean manufacturing system provided flexibility of output within existing production lines as well as rapid demand-induced launching of new products and services. The Japanese firms were competitive in US market, Toyota now being the highest producer of car in US. The manufacturing trend observed in automotive industry and the predominant place manufacturing finds in business level decision making in automotive sector reinforced the importance of manufacturing related decision at strategic and business level. The new trend now in manufacturing is Industry 4.0 or digitalization. Industry 4.0 a common terminology to indicate the status of industrial revolution in 20th century is now more mature and accepted accross manufacturing industries in majority of the Geographic locations. Industry 4.0 is essentially integartion of digital technologies with manufacturing technologies. Majoriy of the management thinkers essentially postulate posititve impact of industry 4.0 on firms sustainability and competitiveness.

From the argument presented manufacturing decisions are profoundly strategic and entrepreneur in characteristics and nature. Following observations can be made regarding the manufacturing decisions:

- The Major part in the input cost of the product is manufacturing cost. Manufacturing related decision influence the total cost of the product.
- Manufacturing can be network of activities between internal and external divisions. For external networking managing IP and core technical know how is also essential.
- The Manufacturing also consists of large investment in tangible fixed assets. This may induce rigidity in the organization increase constrains and make the organization unflexible to market demands.
- Manufacturing capability can be an important source of competitive advantage.
- Technical and performance design parameters are dominating in technicians engineering and scientist decision making. The business dimension to manufacturing systems needs also to be considered.
- Recent development in Digital manufacturing and Industry 4.0 revolution is changing the way products are manufactured and marketed.
- Recent development in Automation, robotics and advanced flexible manufacturing systems had made such systems cost competitive.
- Uncertainty and market turbulence due to pandemics such as COVID 19 can severely impact manufacturing SMEs' survival. Digitally enabled organizational flexibility and agility can be effective for businesses (Luo et al., 2020).

Further the challenges the business environment poses have to be strategically considered in conjunction with multiple business elements and manufacturing is one of the important element. Demand uncertainties, technology evolutions, rapidly changing customer preferences, global competition and environmental challenges have been some of the business environment characteristic in emerging market. Dynamic capability has discussed earlier is effective methodology to stay viable and competitive. Firms assets tangible and intangible have to be flexible and accommodative enough to respond to technological and market demands. Agility in tangible assets to cater for dynamic business condition is need of the hour. Moreover for long term profitability from dynamic capability perspective it is important for manufacturing firm to have capabilities that are valuable, rare, inimitable and non substitutable (Kyläheiko and Sandström, 2007)

Fixed investment in rigid manufacturing setup creates constraints not only from business perspective but also from product or research development perspective aswell. These constraints make its difficult for product designers to respond the changing customer preferences rapidly (Ries et al., 2011) Recent effective product development strategies such as first developing experimental product and trying the product in small set up of experimental market garnering the response and then incrementally tuning the product as customer preferences and feedback starts to come up have been tried more by software firms but have found less acceptance with manufacturing firms. The Primary reason for this can attributed to the inflexibility in

manufacturing system itself. But the concept of developing minimum viable product before mass producible product having integrated the customer feedback remains highly effective and productive strategy for startups in software industry. Replication of this strategy by manufacturing firms while managing the constraints will yield positive and productive results. Digitization of manufacturing process, systems and business process will provide the means and tools to manage the traditional constraints to be agile, dynamic and flexible.

10.2. Advantages of digitization of manufacturing systems within SE context

Digitization facilitates increased flexibility in manufacturing, customization, development of smart products, improvement in productivity and quality. In the beginning of the last decade the concept of Industry 4.0 was introduced in Germany (Lu, 2017) Industry 4.0 is integration of physical objects, human actors, intelligent machines, production lines and processes across organizational boundaries. The aim of Industry 4.0 is to develop a system in which all the processes are integrated and information is shared in real time. The core of Industry 4.0 is digitalization of various component of business, operational and manufacturing functions. Advanced digitization of manufacturing can be described as computer-assisted technologies that control and monitor manufacturing activities, for flexibility, shorter production cycles, fast responses to changing market demands, better control and accuracy of production processes. Advanced and digital manufacturing greatly facilitates the implementation of industry 4.0 in an organization.

United nations industrial development organization report of 2020 observes that advanced digital manufacturing technologies can foster inclusive and sustainable industrial development and the achievements of the Sustainable Development Goals. The emergence and diffusion of advanced digital production (ADP) technologies, artificial intelligence, big data analytics, cloud computing, Internet of Things (IoT), advanced robotics and additive manufacturing, among others is radically altering the nature of manufacturing production, increasingly blurring the boundaries between physical and digital production systems. Under the right conditions, the adoption of these technologies by developing countries can foster inclusive and sustainable industrial development (ISID) and the achievement of the Sustainable Development Goals (SDGs).

World Economic forum community of advanced manufacturing observes that to stay competitive and navigate the new global context, companies and governments must closely collaborate to embrace advanced manufacturing to catalyse change that delivers true impact. Digitization of manufacturing and production systems forms the core of wealth creation and economic development. As observed by the WEF Community Digitized and advanced manufacturing technologies and solutions have been shown to drive impact across the following five categories:

- Resiliency: Improves supply chain control, flexibility and responsiveness to shocks. Digitization enables end-to-end visibility across the value chain, optimize supply and demand capabilities and enables shifting from just-in-time

to just-in-case supply chains, embeds lean manufacturing, Improves resilience to disruptions in manufacturing and value chains.

- **Efficiency:** Digitization maximizes value from scarce resources by enhancing equipment output and effectiveness, by reducing operational and production costs, by enhancing product quality and improving supply demand planning.
- **Sustainability:** Reduce environmental footprints and delivering net-zero goals. This is enabled by accelerating energy efficiencies, promoting renewable energy sources and focusing on value-added energy, enhancing material and water conservation, and circularity and pollution reductions, Reimagining product design and business models, Driving broader ESG change and value chain decarbonization.
- **People:** Empowering workers and society for a just transition. Improving product safety and people's well being and safety, Creating a more accessible and inclusive work environment, Enabling accessible and lifelong learning and empowering workers for a just transition.
- **Innovation:** Adapting what is produced and how. Reimagining product design and enhancing speed-to-market and competitiveness, Enabling business model innovation at scale and customer-centricity, Facilitating product customization and experimentation, Fostering collaboration, innovation and growth culture

It is important to note that these impact areas are closely interconnected. Activities undertaken with the aim of addressing a single impact area often impact multiple areas. Advance manufacturing transformation approaches that consider the end to-end

strategic value chain will drive the biggest impact for industries and organizations. According to a report published in 2020 by United Nations Industrial Development Organization, absorption of new technologies is a key driver of successful inclusive and sustainable industrial development (ISID). An emerging wave of breakthroughs in digital production technologies such as artificial intelligence, big data analytics, cloud computing, Internet of Things (IoT), advanced robotics and additive manufacturing, among others is transforming manufacturing production. In particular, the convergence of automation and advanced digital technologies is expected to lead to the full development of cyber-physical systems.

The manufacturing industry has a significant role to play in reducing global carbon as it encompasses all of the manufacturing value chain and represents nearly 30% of global greenhouse gas emissions (WEF Advance Manufacturing Report 2020). Thus, a sustainable and responsible production, with recognition that reaching key climate targets will not be possible without a significant reduction in manufacturing and production-related emissions. Digitization of manufacturing systems enables collaboration across, and between, value chains and provides opportunity to meet the growing demand for sustainable products, services and their production.

Digitization of manufacturing systems is costly and requires upfront heavy investment. India currently lags in developing and implementing advanced manufacturing technologies on the global index. The resources that are required to deploy digital manufacturing or Industry 4.0 concepts are slowly but steadily rising. Big manufacturing firms enjoy technological and productive capabilities that make them

more likely to adopt new technologies and are already started to implement Industry 4.0 concepts. Automotive production systems and automotive component manufactureres already adapted to industry 4.0. SMEs in India should likewise adapt the digitized advanced manufacturing systems to stay relevent, capable and competetive.

The scenario where there are manifold challenges in digitization and at the same time there is pressing requirement and need to adopt digital technolgies in manufacturing present unique challenges and opprotunities for small and medium firms in india. This concept of Digitized manufacturing [More broadly industry 4.0] thus is considered a strategic and entrepnuer option. In the proposed frame work in this thesis arguments are made for digitization (Indyusrty 4.0) and advance manufactring as one of the core technological principle element for SMEs. Achieving digital transformation and adopting its technology is considered as part of entreprenurail strategic decision making.

10.3. Breif overview of digital manufacturing technologies

Advance digital technologies in industry and particulary in manufacturing industry in the recent years since the introduction of industry 4.0 concept are evolving. The nature of understanding of this systems and defination of this systems is found to be varying among research scholars and industrial practictioner alike. In this segment the breif overview of the systems and thier explanation is presented.

Digital manufacturing can be discribed as an integrated computer-based system of simulation, advanced production and manufacturing technologies, 3D visualization,

analytics and collaboration tools to create product and manufacturing process definitions simultaneously. Digital manufacturing evolved from manufacturing initiatives such as design for manufacturability (DFM), computer-integrated manufacturing (CIM), flexible manufacturing and lean manufacturing that highlight the need for collaborative product and process design. Digital manufacturing enables integration between product life cycle management (PLM) and shop floor applications and equipment. It enables the exchange of product-related information between design, research and development, sales and marketing and manufacturing groups. This alignment allows manufacturing companies to achieve reduced time-to-market and meet volume demand. Firms also realize cost savings by reducing expensive downstream changes.

Industrial Development Report 2020 observes four major technology categories that are emerging, these are digital production technologies, biotechnologies, new materials and nanotechnologies. Figure 21, shows these technologies that are emerging. Advanced digital production (ADP) technologies and their application to manufacturing gives rise to smart manufacturing production system. Smart production can be defined as integration and control of production from sensors and equipment connected in digital networks. The fusion of the real world with the virtual in so-called cyber-physical systems (CPSs) with support from artificial intelligence.

The technology trends of modern digital innovations or advanced manufacturing technologies that enable the digital industrial revolution can be considered in two categories low and high-tier. (Ciffolilli and Muscio, 2018; Kumar

and Srivastava, 2020) Smart sensors, industrial robots, smart wearables and machine controllers are examples of low-tier technology trends of Industry 4.0. The higher tier technology trends of Industry 4.0 are technologies such as industrial Internet of Things (IIoT), Cyber-physical Production Systems (CPPS) or digital twins. Figure 2 provides the Industry 4.0 archetype and explains how technology trends and design principles of Industry 4.0 interact within the manufacturing context to materialize the hyperconnected manufacturing chain concept. Some of the most relevant classifications are those drawn up by the Boston Consulting Group, Pricewaterhouse Coopers and the Italian Ministry for Economic Development (Rüßmann et al., 2015). These classifications considers fundamental technologies namely advanced manufacturing, additive manufacturing, augmented reality, cloud computing, the IoT, cyber security, machine learning, artificial intelligence, Big data analytics and digital platforms.

Following are the key technologies for digitization of manufacturing system as identified by major of the leading expert bodies

a) Big Data and Analytics:

Big data analytics refers to techniques and technologies that allow voluminous machine-readable data to be generated, stored, accessed, processed, and analyzed to uncover valuable Information, patterns, correlations, trends and preferences that can help organizations to make informed decisions. Big data and alaytics in manufacturing context is collection and comprehensive evaluation of data from many different

sources such as production equipment and systems, enterprise and customer-management systems to support real-time decision making.

b) Additive manufacturing:

Commonly known as 3D printing, Additive manufacturing use special printers to create three dimensional physical objects from 3D model data by adding layer upon layer through material extrusion, directed energy deposition, material jetting, binder jetting, sheet lamination, vat polymerization and powder bed fusion. Additive manufacturing contrast with subtractive manufacturing(traditional manufacturing) methods, which use moulds or rotating milling cutters to remove material from a solid block. Companies have just begun to adopt additive manufacturing, such as 3-D printing, which they use mostly to prototype and produce individual components. With Industry 4.0, these additive-manufacturing methods will be widely used to produce small batches of customized products that offer construction advantages, such as complex, lightweight designs.

c) Advanced digital production technologies:

Advanced digital production technologies are the latest evolution of digital technologies applied to production, a core technological domain associated with the fourth industrial revolution. They give rise to smart production also referred as the smart factory, or Industry 4.0. Advanced digital production technologies are combination and integration of hardware software and internet.

d) Internet of Things (IoT):

Internet of Things relies on interconnections through the internet's network of devices, machinery and objects, each uniquely addressable based on standard communication

protocols. IoT is The next iteration of the internet, where information and data are no longer predominantly generated and processed by humans (as most data created so far have been) but by interconnected smart objects, embedded in sensors and miniature computers that sense their environment, process data and engage in machine-to-machine communication

e) Autonomous Robots:

Robots working autonomously and interacting with each other. Manufacturers in many industries are using robots to tackle complex assignments. Modern Robots are now evolving for even greater utility and becoming more and more competent. They are becoming more autonomous, flexible, and cooperative. It is forecasted that eventually, robots will be able to interact and connect with one another and will be able to work safely with humans. Such robots will be designed for less cost and have a greater capabilities than those used in manufacturing today.

f) Collaborative robot (cobot):

A robot that physically interacts with humans. Designed to learn new tasks, cobots are built with passive compliance features and integrated sensors to adapt to external forces. Cobots are typically safe, cost-effective, easy to use and suitable for small-scale production and reduced production cycles. They are also portable and easy to configure and reconfigure for different tasks.

g) Cyber-physical system:

Networked system with embedded intelligent sensors, processors and actuators, designed to sense and interact with the physical world and support production in real time,

guaranteeing performance in applications and allowing machine-to-machine or product-to-machine communication about on how to proceed.

h) Simulation:

In the engineering phase, 3-D simulations of products, materials, and production processes are already used, but in the future, simulations will be used more extensively in plant operations as well. Simulations leverage real-time data to mirror the physical world in a virtual model represented mathematically. Such models can include machines, products, and humans. This allows operators to test and optimize the machine settings by running simulation for considered settings. They are able to identify problem before they occur and hence simulation is driving down machine setup times and increasing quality.

i) Augmented Reality:

Augmented-reality-based systems new technology will support a variety of industrial services. AR can be used in guiding selection of parts in a warehouse or for sending repair instructions over mobile devices. AR systems are currently in initial phases of development, but in the future, companies will have to make much deeper use of augmented reality. This will help in improving their efficiency and provide them with real-time information to improve decision making and work procedures.

j) Smart manufacturing:

The application of advanced digital production technologies to manufacturing production. The integration of these technologies includes workers, manufactured products, equipment and machinery along all stages of production in an intelligent system. The system's components interact with and control each other, take decisions and implement actions

through digital networks of interconnected equipment and sensors, powered by real-time data analytics, machine learning, machine-to-machine communication and other intelligent algorithms.

k) Artificial intelligence:

Artificial intelligence is a branch of computer science used to simulate the human capacity to reason and make decisions. The term usually refers to such artificial intelligence techniques as machine learning, deep learning, neural networks, fuzzy logic, computer vision, natural language processing and self-organizing maps to provide machines and systems with human-like cognitive capabilities, such as learning, adapting, perceiving and solving problems. Artificial intelligence can be defined as making computers intelligent and capable of mimicking and predicting human behaviour and solving problems as well as or better than humans.

l) Digital twins:

A mathematical model of a physical objects like machines, operators, production process and other functions like inventory levels coded for digitalization are called digital twins. Digital twins facilitate representation of physical system into digital environment which can be further processed. Digitized data facilitate rapid analysis of various scenarios and helps in rapid decision making. Process and machines can be optimized.

10.4. Implementation drivers and major barrier for digital manufacturing and smart factory

United Nations Industrial Development Organization (UNIDO) report in 2020 for industrial development highlighted the lower rate of implementation of digitization in

majority of economies and firms. Only few development industry based economies in Europe lead in implementing digitization. Literature review and all leading experts highlight the extensive benefit and competitive advantage for implementing and having a digital strategy. Digitization improved product organizational and business performance (Tohanian et al., 2018). In this section summary of literature review performed to understand the strategies, factors, drivers and barriers to implement digital strategies or digitization is presented. In context of manufacturing industry digitization is synonymous to Industry 4.0. In the following section major strategies factors and barriers evaluated are presented.

Leadership, employees and critical infrastructure

For determining the influence of leadership and the infrastructure leadership selects (Horváth and Szabó, 2019) explored how top executives interpret Industry 4.0 transformation and what main driving forces and barriers they consider. They find main driving force alongside production factors was the management objective for increase control and enabling of real-time performance measurement. The main barrier they identified is lack of competent human resource and finance, management's competence that is leaders lacking appropriate skills and experience and their lack of planning, goals, and ability for allocation of resources and design required structure. Further they identify organizational barriers stemming from inadequate organizational structure and process in organization. Lack of facilitation by leaders for technological integration and cooperation between multi-disciplinary functions or units were also identified as main barriers. These are attributed to leadership failures.

(Müller, 2019) studied barriers for digitization from employee perspective and observed that important factor for the success of Industry 4.0 is employee acceptance. From employee perspective the identified concerns where fear of job losses, lacking experience with new technologies, older employees fear that their competencies are insufficient which might lead to job loss. Other important barrier indentified is the interdepartmental barriers this barriers are due to different appraches among departments, competetive thinking among departments and different solutions among department. It is clear that the application of digital technologies effect the employee morale. On employee of workers perspective (Bonekamp and Sure, 2015)performed a theorotical study and boserved that high skilled jobs with new skills and knowledge will rise, the low skilled job will get redundant. There will be in future growing importance of teamwork, interdisciplinary cooperation and networking with patners, in future there will be increase in flexibility of individual work life, attention towards social media risks and more attention towards IT skillset. One Important finding is that find from thier interations with various experts that as the job gets redundants and are replaced by cyberphysical systems the goverments would incur tax revenue loss and hence conducive tax reforms and regulations would be required.

To explore systems and infrastructure to consider for digital transformation (Ryalat et al., 2023) in their research paper outlined the design of a smart cyber-physical system for digitization or implementation of Industry 4.0. The design of such a smart cyber physical system implements the core industrial, computing, information, and communication technologies for creating a smart factory or digitalized manufacturing. Their paper discusses how to combine the key components (pillars) of a smart factory to

create an intelligent manufacturing system. They argue that the success of digitization transformation or implementation relies heavily on the smart deployment of key enabling technologies. These key enabling technologies identified are internet of things, augmented reality, big data analytics, cloud computing, artificial intelligence, cyber physical systems, additive manufacturing, blockchain, simulation and modelling and advance and autonomous robotics.

Digital transformation drivers and barriers in industries and SMEs

In SMEs context (Agostini and Nosella, 2019) investigated the factors that influences SME adaptation of digital technologies and technologies such as advance manufacturing. Their study observed that the management support strengthens the relationship between financial resources invested in digitization and SME adoption of these technologies. Further they find that the absorptive capacity strengthens the relationship between internal and external social capital and SMEs adoption of digital technologies and further internal and external social capital will be positively associated with SMEs adoption of digital technologies. SMEs managers play a vital part in adaptation by motivating employees, improving their skill set and facilitating the change management. SMEs managers also play a vital part in evaluating the relevant technologies that needs to be adopted. Similarly, a study conducted by (Arumugam et al., 2023) stress upon the importance of leadership on digital technology adaptation. SMEs leadership needs to reorient their strategy towards attracting, developing, and retaining digital skill set talent. They need to develop a culture of innovation and agility. productivity, accountability and transformation into a digital environment workspace.

(Ghobakhloo, 2020) Performed a study and analyzed the determining factors for implementation of information and digital technologies. He identified eleven factors that enable implementation of digital technologies. These factors are perceived benefits, financial resource availability, management support, operations technology maturity, digitalisation maturity, openness to change, employee qualification, seamless integration capability, corporate social responsibility policy, strategic roadmapping for digitalisation and finally cybersecurity maturity. He observes that enablers for digitization technologies are matured and the way manufacturing firms utilize and deploy or implement these technologies will determine their performance. Their study proposes analysing the business value of smart manufacturing and after positive business case firms and top management should ensure that three drivers are implemented. These three drivers can be summarized as ensuring financial resource availability, providing management support, and generating a strategic roadmap for digitalisation.

(Kraus et al., 2021) Performed a study to understand the digital transformation achieved in industries by performing literature review of research on digital transformation. They identified three main constructs that can be drivers of digital transformation for companies or organizations. The first is digital transformation of business process. Digital transformation of business process influences and determines strategy, enterprise architecture, customer value proposition, customer relationships, business models, operations and management models, resources and capabilities, leadership, knowledge management including open innovation and the scope of networks. Second construct identified is technology and the final construct is impact of organization and society.

(Thanh Nguyen Hai et al., 2021) In their evaluation of digital transformation process in emerging countries identified and proposed some methods for driving digital transformation and implementation. Primarily they identify challenges such as lack of proper planing and understanding among leaders and other challenges such cybersecurity, privacy, regulations, confidentiality, governmnet support and skill set of workforce current and future. They proposed a five stage process for implementing digital transformation and for overcomming the identified challenges. Stage one is the foundation, in this stage, organizations actively automate internal processes to convert manual efforts into data. Stage two is termed as siloed in this stage organizations begin to use disruptive technologies to create new possibilities. The efforts in this stage remain submerged in discrete functions and without the overall strategic transformation of the organization. In stage four fully synchronized and new digital platform is formed, but the transition is not completely done, a small change is achieved which is not to be interrupted. In Stage five living DNA is formed, which will make digital capabilities adapt to new cultures, sustain transformation as the disciplined way for continually innovating and setting new adaptive trends. Importantly they identify leadership skills and a digital transformation mindset as important skills in a leader to drive digital transformation. Similar study by (Anas Mahmoud Atieh et al., 2023) observe that in emerging economies due to lack of leadership and management mindset firms experience delays in using advance digital technologies as management lack knowledge and effective communication strategies. In emerging economies, the labor cost is lower and due to the lower cost of labor incorporating technological innovations is less attractive.

Barriers and drivers according to top consulting firms

A 2015 report by Boston consulting group on industry 4.0 and future of productivity and growth in manufacturing industry presented some recommendations to producers and suppliers. According to their recommendation producers must prioritize upgradation of workforce and their competencies along with production process. This can be done by first identifying the key areas of improvement in flexibility, speed, productivity, and quality and then analyzing how digitization can drive improvement in this designated area. They recommend producers conduct workforce planning and train and recruit IT skills. For manufacturing system suppliers, they recommend analyzing how digital technologies can be employed for new cases that offer benefits to customers in segments like software development, analytics driven services and in embedded systems and automation. For manufacturing suppliers, they recommend developing business models for digital offerings, developing strong technological foundation, building the right organization structure and capabilities, developing partnerships, and participating in shaping technological standardization. A similar report from Price water coopers in 2016 on adoption of digitization observes in their survey that industrial leaders are digitizing essential functions within their internal vertical operations processes, as well as with their horizontal partners along the value chain. In addition to this they observe that industry leaders are enhancing their product portfolio with digital functionalities and introducing innovative, data-based services. Further they observe that to implement digitization strategy top management commitment and significant implementation investments are required. Based on their experience they recommend six practical steps to digitization. Step

one is to map out Industry 4.0 or digitization strategy based on the current immediate requirement, step two is create a pilot project, step three is to define the capabilities that are needed or demanded for the current business fourth step is development of expertise in data analytics fifth step is to completely transform into digital enterprise and the last step is to adopt ecosystem approach that is fundamentally developing complete digital product and services solutions for customers.

(Fitzgerald et al., 2014) along with Capgemini consulting conducted a survey to understand the digitization drivers in various industries. They observe that most companies struggle to implement and if implemented they struggle to get clear benefits the underlying reason, they attribute to management's lack of temperament and less experience. They highlight nine obstacles or barriers they are no sense of urgency, no funding, IT limitation, unclear roles and responsibilities, lack of vision, unclear business case, silos working, culture, lack of leadership skills and regulatory concerns. To achieve digital transformation, they suggest that beneficial investment cases should be ensured and secondly without active and motivated employee engagement transformation is slow and hence the incentives structure must be in place that rewards employees for embracing digital transformation. Similar study by (Treviño-Elizondo, Bertha Leticia) identify the driving factors for firms to adopt or implement digitization. The six major driving factors identified were operational benefits, market opportunities, labour problem, customers' requirements, competition and company image. They identified broader factors that influence management decision making into accepting the digital or advance industry structure. They observe that the perceived improvement in product quality and service

among customers offers a competitive advantage. Their findings suggest that manufacturing firms need resources, skills and leadership support to initiate the transition toward digitization. Manufacturing firms with tangible resources such as qualified human resource, machinery and equipment and intangible resources such as skill and capabilities are more likely to achieve digital transformation.

Drivers and Barriers in SMEs in developed nations

(Ghobakhloo et al., 2022) performed a study to identify drivers and barrier of industry 4.0 adoption by manufacturing SMEs and how smaller businesses can be empowered to pursue digitalization. They developed a roadmap with five primary conditions essential to successful digital transformation. The roadmap is shown in figure 23. The roadmap explains how readiness of value chain internal and external is critical to the SMEs adoption of digitization technologies. Developing this readiness is challenging and require development of specific capabilities in cybersecurity, change management, information and digital technology governance, digitalization strategic planning, Operations technology capability assessment, and supply chain collaboration.

(Brodeur et al., 2022) Investigated the characteristics and dynamics of the organizational changes needed to facilitate the management of an digitization and industry4.0 transformation in manufacturing SMEs. They concentrated mainly on north american SMEs. In their research they found that firms perform organization changes to solve their shortcomings in facilitating digital transformation. The changes performed were categorized in three categories support organizational change, project organizational change and post-implementation organizational change. Support

organization change represent changes in different project management processes within the company and introducing new roles and restructuring the departments. Project organizational change represent mainly changes that facilitate the introduction of new technologies and processes and finally in post-implementation organizational change employees and managers identify the company's organizational changes following improvement opportunities once the technologies were implemented.

The crux of their finding is that the firms need to understand that managing their digital transformation will be over time through small organizational changes triggered by shortcomings during the projects, new opportunities and short-term needs. Similar study was performed by (Cimini et al., 2020) among Italian firms their research provides preliminary understanding about how organisations and technologies co-evolve. They observe that to develop a proper strategy for transition towards the smart manufacturing model requires enaction of proper organisational structure. Technologies should not guide organisation redesign, but companies should leverage them to make the organisation capable of adapting to new processes. SMEs should evaluate their capability to utilize the digital technologies for innovation and evaluate the maturity of their organisation, with specific attention to structure, jobs and competences.

Drivers and barrier as reported in Indian SMEs and developing countries.

(Sachin S. Kamble et al 2018) Presented a paper in which they analyze and identify potential barriers which would hinder the manufacturing organizations from embracing Industry 4.0 or digitization. This identifies twelve key Industry 4.0 adoption barriers through an extensive literature survey. These twelve barriers identified are legal and contractual

uncertainty, employment disruptions, organizational and process changes, need for enhanced skills, lack of knowledge management systems, lack of standards and reference architecture, lack of internet coverage and IT facilities, security and privacy issues, Seamless integration and compatibility issues, regulatory compliance issues, high implementation cost, lack of clear comprehension about IoT benefits. Further they observe that in India, Industry 4.0 is currently perceived to be a relatively novel concept and requires more elaborative studies which will draw clear definitions and interpretations. Practitioners can achieve a high level of process integration by deploying the Industry 4.0 as an outcome of cyber-physical system and human-equipment interface. The identified barriers are attention points for the managers and leaders. Similar study performed by (Wankhede and Vinodh, 2021) among Indian Manufacturing SMEs to identify the digital implementation barriers. The organizational and strategic barriers they identify through their study are lack of skilled manpower, lack of robustness with respect to environmental conditions in automotive environments, lack of cooperative production systems, conversion of information analytics and CPS data to actionable information, lack of awareness, difficulty in developing real-time linkage of smart factory and physical production, lack of modularization, cyber-physical security issues in manufacturing systems and finally dependability issue with monitoring and actuator infrastructure. Similar barrier in implementing digitization was identified by (Vinodh et al., 2021) their study explored the advantages of combining lean six sigma with digitization. They identify lack of top management attitude, commitment, and involvement along with lack of training and education as the most dominant barrier prevailing in Indian SMEs. (Chauhan et al.,

2021) identified how intrinsic and extrinsic barriers negatively affect adaptation of digitalisation. Both of the barriers intrinsic and extrinsic were identified, intrinsic barrier consists of coordination problems, top management reluctance, lack of competence and strategy, employee resistance, inferior existing data, cost, lack of clarity and data integration challenges. Extrinsic barriers identified are government policy and support, cyberphysical privacy, limited understanding of ethics and safety, skill deficit in labour market, reluctance from supply chain partners, legal and contractual ambiguity, trade restrictions and unavailability of IT hardware infrastructure such as broadband width. (Elhusseiny and Crispim, 2022) did a comparative analysis between barriers between developed countries and developing countries and their finding identify greater barriers in developing countries but greater opportunities. Their main discovery is identification of legal barrier for implementation.

10.5. Conclusion : Digitization framework (Guideline) in Context with Strategic entrepreneurship

From presented literature few patterns emerge that can be used to generate the framework for digital transformation. This can be done three steps as explained below:

A. Preliminary evaluation

a. Evaluate digital technologies:

Digital technologies are costly to procure, implement and operate. Many technologies are available that can digitize the process both manufacturing and business. It is important evaluate these technologies and their adaptability, maturity level for the existing process or products. Appropriate technological aspects of available options have

to be analyzed for intended objectives like customer satisfaction and value generation. There might not be case for all the technologies to be implemented but there might be case for fewer technologies that can provide tangible benefits. Evaluation is strongly recommended by leading experts and in the literature review performed.

b. Evaluate Cost -Benefit:

Business case and tangible benefits should be assessed. Research has identified that not all digitization efforts result into positive financial benefits. It might not be advisable to disturb the existing work flow and organization structure but it will be advisable to assess the future implications of considering the digitization.

c. Evaluation from Strategic entrepreneurship context:

Digitization augments the dynamic capability of the organization radically. The agility introduced in the organizing structure and greater understanding of the customer perception of service or product will have profound impact on the success of the firm.

The data and information gain from digitization enables identification of new opportunities for a product enhancement, new product development or new service development. The in-depth connection and collaboration enabled by digital technologies with various stakeholders from suppliers to customers puts the firm in an ideal position to explore business opportunities as well as to gain strategic advantage.

Capability of the firm to orchestrate these benefits from Strategic entrepreneurship context should be considered and evaluated.

B. Partners identification

a. Data and Software

Digitization require advance technologies in software, sensors and cyberphysical systems. Skill set of manufacturing sector differs to the skillset required for the digitization. India has leading ecosystem for software and hardware systems and all major softwares have respectable installation base. Evaluation of the softwares inline with the product, business and manufacturing process has to be conducted

b. Advance Manufacturing systems

With the advent of digitally controlled advance manufacturing systems such CNC machining centers and reconfigurable robotics systems manufacturing is becoming more agile and flexible. Additive manufacturing of both metal and polymers are observed to be on rise. In recent years deployment of additive manufacturing and hybrid manufacturing technique would increase. Small and batch produced components will be able to economically be manufactured.

Deployment of right manufacturing machines with digital capabilities will improve the dynamic competence of the manufacturing unit. Selection and utilization of such digitaly advance systems have to be carried out with the relevent experts.

c. Acedemia Patnership for training

Training in IT and the digital systems have to be initiated Literature review have identified the insecurities within the existing employees in deployment of digital systems, one primary fundemental apprehension among employees is the lack of IT and digital skills. Acedemic institutes can provide support for training and upgrading the existing

workforce skills and provide future ready advance skilled workforce. Apprenticeship and interns can be utilized by SMEs from academia to provide the necessary future workforce with digital capabilities and skills that will be rooted in firms competence.

C. Organization set up and Digitization deployment

Digitization is a tool to achieve efficiency flexibility, agility and dynamic capability. Digitization can improve competence of the organizations drastically. As with any tool the skill of the user is paramount for the outcome. Management and managers have to utilize digitization to orchestrate competence, efficiency, agility, innovation and dynamic capabilities. Placing system in place is no guarantee of a favourable outcome. System have be utilized skilled-fully and hence the organizations setup, operational metrics and KPIs have to be radically different for digital organization than that of the traditional organizational.

Second important observation of many scholars is that the deployment and skillfull use of digital system is a done iteratively and smore specifically over the period of time (Brodeur et al., 2022). Organisation structure should be able implement, drive and measure the outcome of digitization efforts. Systems should be in place to accure the learnings during implementation and driving phase. The accrued learn should provide the further drivers for course correction.

- a. Organization structure: Should include leadership levels with good digital skills set. Leadership is appreciation of digital technologies and leaderships effort in terms investment not only it terms of money by time plays major role effectuating the change or digital transformation. Clear distinction of

roles and responsibilities. It is important to have managers and respected
interval within the hierarchy drive the transformation and implementation

- b. Operational KPIs and Metrics: transformation or digitization drive requires implementation of different key performance indicators for the digital systems performance within the organization structure. Operational metrics will be also be required to develop to capture the operational characteristics of the process which have been digitized.
- c. Organization Culture: Organization culture needs to be developed and encouraged where digital technologies are embraced and IT skills are encouraged in manufacturing firms. Organization culture should also encourage experimentation with the acquired digital tools. Culture should essentially embrace the digital change and catalyze innovation capabilities achieved by augmentation of opportunity exploration and exploitation by digital technologies implemented.
- d. Incentive and rewards for embracing digitization and utilizing digital tools for efficiency and innovation. Sufficient incentives structure has to be in place for effective utilization of digital techniques in manufacturing.

CHAPTER XI:

VALUE CHAIN MANAGEMENT

11.1 Relevance of value chain management for SMEs

Supply chain is a critical component in India for SMEs in manufacturing sector. The methods deployed to manage and organize supply networks greatly affect the economic performance of many businesses. MSMEs and SMEs, due to their limited resources rely on strategic networks and partnerships. Aggressive local and international competition is pushing the performance requirement higher and the resources allocated to meet the performance requirement has slowed the growth of SMEs in India. In the manufacturing sector the dominant sector is automotive where the SMEs supply components to bigger conglomerates (OEMs). The Indian automotive manufacturing industry as an strategic policy now transfers many of their engineering tasks to their component suppliers in order to effectively tackle their risk and challenges (Kotturu and Mahanty, 2017). Further with intense competition in automotive sector with global supply network now being stronger than ever SMEs in India with their limited infrastructure resource find challenging to compete and stay relevant, this puts intense pressure on their financial performance. This condition can be similarly considered for other sectors.

Geographical spread of the Indian subcontinent with geographically spread resources and markets makes it important for Indian SMEs to manage their supply chain effectively. The cost of transportation with increasing freight prices forms a major chunk of the input cost. Geographically spread markets thus add to the input cost in the form of transportation cost. Many of the resources like metals and chemicals remain mined by the state-owned

enterprises. With many trading layers the competition to secure the resources or the raw material remains intense. The geographical spread of market and supplier not only increases the financial risk but also operational. The recent outbreak of Covid-19, caused disruption in transportation of various goods. Further the political scenario within India with different tax structure had to the complexity of managing the supply network.

Globalization of supply chain network and shifting of manufacturing process from developed countries to developing countries like China, India and Vietnam are providing fuel for growth for Indian SMEs. Recent disruptions due the pandemic has further identified the need for global diversification of sources of critical supplies especially electronic component to alternate cost effective countries than asian countries or to different countries within Asia. India is rich in minerals and enjoys large skilled workforce. With the skilled workforce and abundant availability of input raw material India can be one of the worlds leading manufacturing hub. This provide more opportunities for the Indian SMEs to be part of the global value chain network. It also generates the necessity for Indian SMEs to network and partner to various international specialist firms for know how and knowledge development. Competition in manufacturing sector from China is a major challenge. Indian SMEs have to creatively orchestrate supply chains and manage value chain innovatively.

Management of value chain will involve detail systematic analysis of internal and external network of activities, analysis of supply chain, analysis of logistics mechanism and facilitating and cordination of activities between different fuctions.

11.2 Value chain and supply chain critical difference within SE context

Supply chain management remains an important management construct. Supply chain management is a well-researched and academically developed subject. The tenets and principles of supply chain and supply chain management are well published and easily accessible. This research will not delve into supply chain or supply chain aspect but rather it will consider supply chain as a part of value chain. Value chain hence will be elaborated in context of strategic entrepreneurship.

Previous chapters described the activities the firms will perform, and top management has direct control over these activities. All the activities that are performed within the firm's business and professional boundaries are planned, executed, monitored and controlled by the firm's managers. The primary objective of the activities is to gain superior returns for the investments incurred for the various activities. With modern firm functioning as a part of constellation of various industrial firms with varied capabilities it is necessary to have a mechanism in place to exercise managerial outlook over the activities performed outside of the firms' boundaries. Value chain management is a construct of management that provides the necessary continuity across firm's boundaries. Managers are required to think in terms of the value addition to the product or service. Michael Porter who devised the term value chain and his theory of value chain takes a financial view of the sequential value creation process in a network of firms. In value chain management the aspect of value creation and appropriation has been introduced as "value constellation" and "value grid" (Normann and Ramirez, 1993; Pil and Holweg, 2006)

According to (Holweg and Helo, 2014) the “value” perspective and supply chain in this perspective is that firms can enhance their competitive position by considering the value streams they are operate in and by considering other parallel ones that use the same supply and distribution and retail chains as a “grid” in which they operate. In supply view it is assumed that the flow of information and material occurs seamless with no disruption and avoiding excess inventory, the bullwhip effect and long lead times is main objective. With value chain management of architecture the objective is to adapt to external or contextual changes in light with the evolving business strategy. Value chain management objective is to reconfigure roles and relationships between the firm, suppliers, partners, logistic agents and customers in order to create value by new designing new combinations. Value chain management technique broadens the horizon of management and outlook it seeks to collect information from multiple players. This makes for the firms possible to plan and maintain business continuity economically across different functions. This functions could be within or outside of the firm.

Value chain broaden the management spectrum, supply chain becomes one component of the spectrum. This method will place firms to create competitive advantage, enable them to identify opportunities faster and exploit the opportunities quicker. This element of value chain makes it relevant to strategic entrepreneurship.

11.3 Overview of value chain and SMEs in manufacturing:

Michael Porter in his groundbreaking book competitive advantage introduced the concept of value chain. He proposed the value chain concept as a technique or method for analyzing organizations based on their business operations. The value chain model as

proposed by porter have nine activities. These nine activities are broken into two components primary activities and support activities.

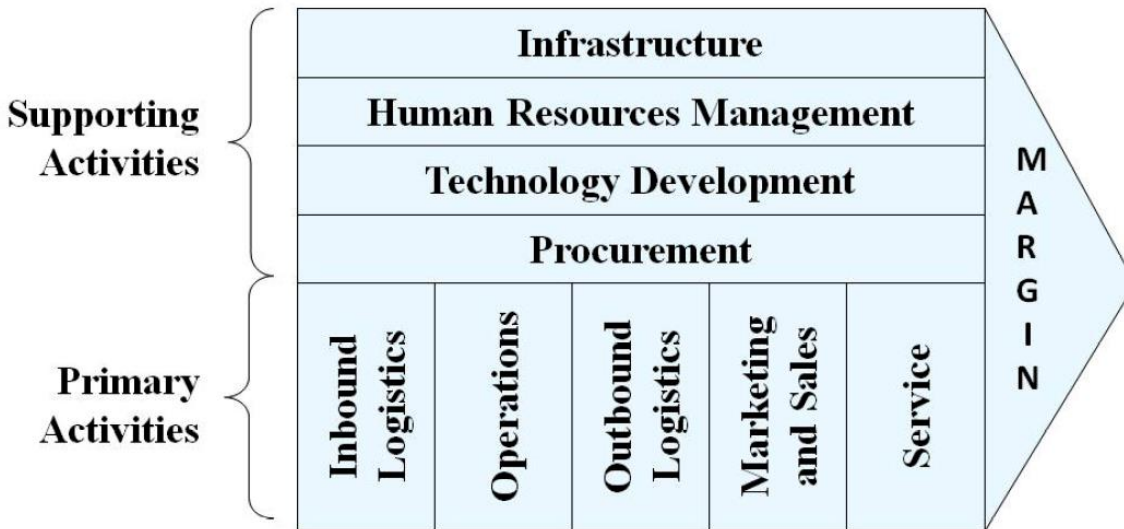


Figure 12 Michael Porter Generic Value Chain model. Source: Competitive advantage (1985)

Value chain model proposed by porter is a tool for analyzing similar firms in a particular industry segment. The model is also a tool to evaluate the performance of the various functions within an organization. The analysis by such a method generates inputs for leadership teams to develop strategies that provide competitive edge over the rivals. The value chain concept is essentially a tool to maximize the financial gain. Supply chain concept which is a modern-day concept is tool to maximize the operational efficiency of the firm (Holweg and Helo, 2014)

Thus Supply chain essentially is a component of value chain. Value chain concept provide a wholistic approach for designing and developing efficient process and supply chain. A value chain view provides a broader context to the supply chain. It considers

supply chain in context with value creations and value appropriation along with its ingrained financial aspect. Manufacturing firms consider efficiency and agility in order management, inventory management, demand forecasting, supplier selection and supplier quality management, time to market as important components of supply chain. Manufacturing firms would benefit if these activities were considered and integrated with value creation activities and are together managed and controlled. Collaboration with suppliers not only for cost advantage but also for knowledge sharing and co development of technologies for enhancing the total value potential of the product or the service the firm engages is essential. Firms no longer compete on product on the basis of product quality alone but based on the value they provide to their customer. External networks in conjunction with the internal network of functions are responsible for the creation of value. SMEs in the manufacturing sector can be either a part of the broader network, such as a press shop for automotive OEM supplying one component or can be consumer of a product or service of one of the network elements. In both the scenarios it is part of the broader network which together is creating value. Each firm may appropriate value differently, but they together are responsible to create value which consumer realises and ultimately pays for. This aspect of networks [ascribing value for each element] makes it essential to considers function of an element within a value creation network, and then proceed to explore any business opportunities. The constellation of firms or the network of firms producing a service or product may have different business challenges like projecting the market demand, securing preferential rates for input material, technology challenges, or quality related challenges. This challenge provides both risk and business opportunities for

the SME firms to move up the value chain. Thus, for manufacturing SMEs superior outcome is more probable when the supply chain is considered within the context of Value chain management.

11.4 Orchestration of superior business value chain

Modern day business performs series of activities to meet the customer demand. There are various interaction points outside the boundaries of the organization and often critical functions remain performed outside the boundaries of the managerial organization of the firm. Within the boundaries of the firm a firm may adopt good management practices, introduce efficiency in its operations and have good level of customer engagement. From a managerial perspective the activities or series of activities performed by the firm within its boundaries are easily controllable and rectifiable if there be any deviations. In manufacturing many of the activities critical to quality and business success lie outside of the firm and such activities are coordinated by supply chain management. Many researchers identify that these supply chain and supply chain management or management of supplier impact firms short and long-term business success (Rungtusanatham et al., 2003; Zhu and Sarkis, 2007). That is why firms business model should have value management systems in place to supervise such activities. The management of value chain is leadership function. Leadership designs business model. Some researchers consider value chain as the basis for business model generation. (Strakova et al., 2021) suggest that the analysis of value streams regarding the integral and unique system of the corporate environment is suitable for the projection of business models that the firm can adopt. Such analysis will help leadership to provide superior shape to the business model for their firms.

For small scale manufacturing firms if suppliers fail to provide the required level of performance in terms of delivery and quality, this may impact the very viability of the firm. If the firm is not able to convert or process the raw material into finished goods within the planned business cycle and is unable to ship the finish goods to the customer along with the firm's reputation the cash flow of the firm is negatively impacted. Many SMEs are themselves a part of the value chain for the bigger OEMs. If the SMEs fail to manage their value chain, they risk of losing essential contracts with the bigger firms on which they rely for their bigger chunk of revenue.

In this chapter some of the value chain creation methods are proposed in context with strategic entrepreneurship. Value chain creation methods which in context to competitiveness and entrepreneurship are produced in this section. While the topic of value chain and supply chain remains extensively researched only the relevant information regarding the creation and design aspect of value chain is considered in this section.

SMEs are required to be creative in managing their value chain. It is important to have mechanisms in place to monitor and supervise the activities outside of the firms' boundaries through effective value chain management methods. Few researchers such as (Green Jr et al., 2012) recommend for supplier management following main categories are required to be considered.

- Quality: The quality of the output of the supplier
- Service: The level of service offered by the supplier should influence better decision making
- Organization profile: Organization profile of the supplier

- Process management as well as product and process innovation: Managerial and innovation method deployed by the supplier.
- Cycle time for key work processes: Supplier process and operational efficiency (Compare to the standards or alternatives)
- Traceability: Information system deployed to trace the parts or the process variable during operations and during logistics

Apart from above mentioned categories Information and communication technology (ICT) that are used to link both suppliers and customers, are vital technologies that define an effective business value chain essentially along with good operational systems and their management (Kess et al., 2010)

(Holweg and Helo, 2014) In their research paper proposed a five-point framework for defining value chain architecture at the firm level merging the financial value chain view with the operational supply chain considerations. The five-point framework defined is based on their extensive research with ABB corporation managers for creating successful value chain. The five point framework considers value provision, operational footprint, risk management, order fulfillment strategy and customization and buffering mechanism. The proposed framework based on the five-point mentioned should aid designing of value chain architecture.

(Durga Prasad et al., 2014) In their paper demonstrated a methodology to design a supply chain which achieves a strategic fit between competitive and supply chain strategies. They used quality function deployment (QFD)-based optimization methodology to design a supply chain for a product. Quality function deployment (QFD) is one of the

quantitative tools and techniques in domain of total quality management. QFD is used to translate customer requirements into appropriate technical or service requirements or product specification. The proposed methodology objective is to maximize the prospective value generated by a supply chain relationship between competitive and supply chain strategies, this values further are required to be evaluated and understood (Durga Prasad et al., 2014) The proposed QFD-based optimization methodology in their research paper for supply chain design, provides a step-by-step process for aligning the competitive strategy with supply chain strategy. Their novel QFD based method optimize multiple objectives from customer perspective, it finds optimal supply chain design objective value which maximizes SCP. Their proposed methodology is an analytical methodology, it is designed to provide an approach to integrate customer preferences and designer intents into the supply chain planning decisions. Their proposed method generates a supply chain which is strategically aligned to respond to customer inputs.

(Kayakutlu and Büyüközkan, 2010) Considered traditional value chain in context with the innovation and collaboration. They identified the effects of innovation on value creation they also identified effect of collaboration and collaboration effectiveness on value creation. One of the important elements they identify is knowledge management for competitiveness in context with the value chain. For the design of a successful value chain management should have information that can be used in analytical models of decision making. The research conducted by the authors provides a weighing factor for various linkages and importantly for the competence and knowledge present in the firm to predict the effectiveness of the designed value chain.

(Kayakutlu and Büyüközkan, 2010) In their research paper provide an analytical framework that the leadership can use for management and design of value chain by identifying success factors from perspective of competence level in value chain. Once the competence levels are identified they can be iteratively used to design an effective value chain. In their paper they successfully developed and proposed a supply value chain evaluation model that would help in designing a value chain. They performed extensive literature survey and in consultation with industry experts devised an evaluation model that considers tangible and intangible along with quantitative and qualitative factors. The evaluation process grades the competence level of the adopted supply chain. They define conceptual framework for supply chain effectiveness in levels of supply chain targets, knowledge management dynamics, competence levels and competence success attributes. Their research led to the finding and conclusion that individual competence in continuous learning and networking along with innovativeness of the team are the three most important competence attributes in supply chain effectiveness. An effective supply chain or value chain enhances business value by providing sustained competitive advantage along with cost benefit.

In context with strategic management, where the objective of the activity should also be to explore and exploit business opportunities simultaneously the evaluation framework as proposed by (Kayakutlu and Büyüközkan, 2010) is a valuable tool. Creativity and innovation are one of the components that get measured in the proposed framework. How knowledge learning and sharing is achieved is also measured parameter. In firms and businesses where the activities are networked or take place outside of the firms' boundaries

the knowledge and know how sharing across the firms' boundaries is important for innovation and creativity to manifest. How effectively synergy is created and utilized for competitive advantage is also measured in the proposed framework.

In the proposed framework the explorative dimension of entrepreneurship is not explicitly mentioned or considered. The framework has ability due to the knowledge sharing and information sharing agreement between the network firms to explore business opportunities. Free flow of information and closer functional links fosters innovative and creative work engagement.

Porters value chain model is highly valuable model. It has been referred by almost all experts from different industry stream. However the porters model was designed when the business environment was different than the present. The applicability of the model with present is required to be evaluated. (Presutti and Mawhinney, 2009) evaluated extensively the porter's generic value chain and proposed an interesting revision. They argue that porter's model does not consider culture component, leadership role, human resource development and management, infrastructure significantly enough. They also argue that the role of the customer has to be more explicit in the value chain. Considering the challenges and time pressure the modern business and firms face for value creation they proposed a contemporary value chain model. Their model includes the following mentioned functions.

- Leadership: Leaders must be able to understand the value chain and have a total knowledge and insights into its value chain and importantly understand how the various links and interactions create value.

- Goals and strategy: Firms top leaders should identify goals that aligned with customer needs and firms activities, strategies and plans should be aligned to full fill the set goals.
- Leadership team must also design values and metrics that define the culture of organization.
- Culture and people: Modern industries and firms perform set of activities in steps or process. Different activities are interconnected to generate the required output. For this reason, the culture the firm promote should encourage and reward collaboration and collaborative mindset. Firms should induce work environment that fosters collaborative environment.
- Infrastructure: Infrastructure of any firms can be considered of primarily four component which are process, technology, facilities and organization. Of these the first three process, technology and facilities enable firms value proposition by providing the employees with the necessary tools and support to materialize business goals and strategies. If the organization fails to provide the required infrastructure its competitiveness will be affected impacting the economic performance of the firm. Thus, the infrastructure that is aligned to the goals and operational needs is absolutely essential for business success.
- Information management: In dynamic business environment information management system play a vital role to provide the necessary inputs in value chain management. Supplier management, enterprise resource management and customer relation management is increasingly be performed by bigger organizations. Internet

based tools are widely available that can enable seamless integration of internal as well as external function. Information enabling tools or software should be made available to all the functions within the value chain, this is easily achievable with cost competitive programs already available in the market.

- Budgeting and financial support: Organizations and even small firms exercise control over the activities by adopting to standard management accounting practices. From the accounting practices followed the target cost or the selling price is figured out. Which ensure the required profitability. Accounting practices in context with value chain are very important, as the accounting practice adopted should be able to identify deviation from standard cost or should be able to detect costing variations in the chain. This should enable the improvement inputs product management teams or to the top leadership of the firm.
- In context with the value chain management finance management help in planning strategically. Finance management helps in planning the future through efficient management of operations, and by recording financial performance. According to (Presutti and Mawhinney, 2009) to maximize value creation leadership should use activity-based costing, target costing and life cycle costing to evaluate strategy and make decisions. This would also require analysis from the top to identify higher cost activities and designing control policies to control the cost or identify and remove the cultural problem that are leading to increased cost of the activity.
- Product development: Product development is the transformative process that converts an idea to a product or service that customers value (Presutti and

Mawhinney, 2009). Product development have functioning and important interface with various functions. A supportive culture should be promoted to improve collaboration between departments. The required infrastructure should also be made available that facilitates efficient collaboration.

- Supply chain management: According to Michael Porter the value chain model consists of inbound logistics, operations, outbound logistics, marketing and sales and customer service. These activities are termed in modern management as supply chain management. The new model proposed considers the primary activities and the context of these activities is broadened to include other fundamental elements that are now important to value chain creations. These elements are understanding the customer needs faster and converting these needs competitively into customer value.
- External Resources: The new model of value chain creation considers external resources or the activities outside the enterprise boundaries as an important linkage. Strategic entrepreneurship considers this also an important element for success of a business or firm. Competitiveness of firm is greatly influenced by the quality and its external networks that adds value to its core operations and offering. Value chain management encourages deeper networking with suppliers to engage them and make use of their information or knowledge to augment the product development process to create value.

The contemporary model for value generation as developed considers the effective functioning of the value chain to be depending on the quality of firm's leadership, the

culture firm promotes, the quality and capabilities in the people firm develops and the quality of infrastructure the firm develop to materialize its strategy into customer value.

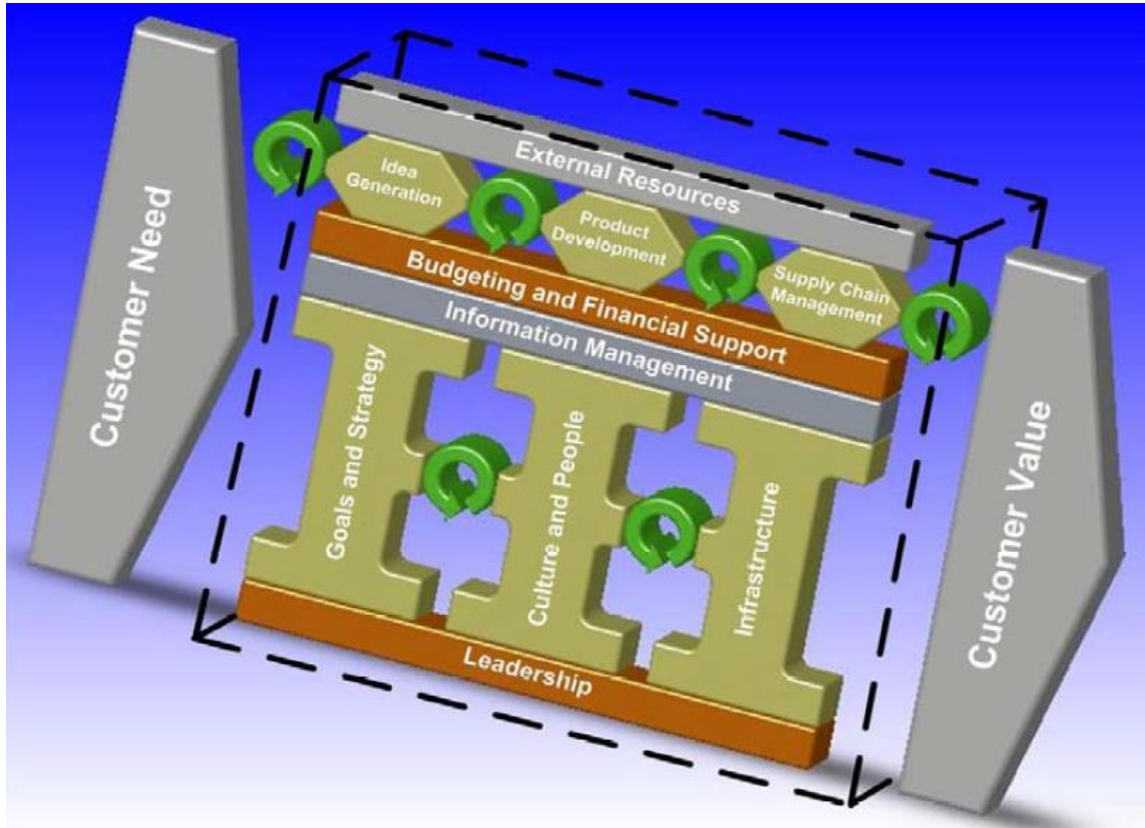


Figure 13 Source: (Presutti and Mawhinney, 2009) Contemporary model for value chain

11.5 Conclusion: Value chains should be created with SE context

From the available literature the value chain creation methods proposed by various researchers are reproduced here. The methods are considered in context with the Strategic entrepreneurship objectives. Exploring opportunities and exploiting opportunities should

be an extensive component of the value chain creation process. Supply chain can be considered as one of the component of the value chain process.

Most valuable and relevant method that SMEs can adopt to tackle both the supply chain and value chain problem can be that as proposed by (Presutti and Mawhinney, 2009) The contemporary value chain model as they developed and proposed is a comprehensive model and very relevant to strategic entrepreneurship. The model considers the effectiveness of leadership and culture, quality of infrastructure, the financial tools and techniques utilized by the firm. They consider product development and idea generation also to be part of the value chain network. External networks form an important element of their model. The supply chain also is an element of their model. The contemporary revised value chain model accounts for the contemporary skills and functions within the ambit of value chain. This makes it versatile, and its implementation will drastically improve the probability of success.

Manufacturing SME as described earlier are part of the bigger value chain network. They are responsible for one of the functions in the broader network of firms. Cost pressure, market dynamics, competition both internal and external, input cost escalation, disruptions in operation are some of the challenges that business faces. These challenges cannot be countered by any firm or addressed adequately if considered in isolation of other networking firms. The collaboration and sharing of know-how has now become routine for many firms. The new information that is generating and the ability to utilize a know-how or leverage competence outside the firms' boundaries provide the necessary fuel for innovation, new business ideas and for new market segment. It is already observed that

sharing of tools and molds are carried out between firms. Sharing of raw materials to address fluctuation in demand are also happening. The scope for collaboration further improves opportunity exploitation potential for firms.

In context with strategic entrepreneurship the possibilities for simultaneous exploration and exploitation of business opportunities can be enhanced greatly if the value chain architecture of the firm is designed and developed for strategic entrepreneurship objectives. From the current literature review relevant method that SMEs can adopt proposed by (Presutti and Mawhinney, 2009) which is contemporary value chain management.

CHAPTER XII:

RESULTS: INTERVIEW SURVEY

12.1. Survey methodology

The objective of the survey is to have qualitative understanding of the extent of managerial understanding of the various constructs of strategic entrepreneurship in manufacturing firms. An extensive interview structurally focused on the elements of strategic entrepreneurship and how they are understood by managers, how and when they are considered in their decision making and what are the perceived benefits of the elements is tried to be explored.

12.2. Interview strategy and methodology

First a questionnaire with management specific words like “business model”, “strategic foresight” and “Strategic entrepreneurship” was requested to be filled. Little information was provided regarding the meaning or the definition of the words. Respondent based on their understanding of the definition or meaning were require filling in the questionnaire. The questionnaire is basic framework developed in this research. After the completion of the questionnaire detail exploratory interviews were conducted. During this interview process details meaning, and definition of the terminologies used were explained gradually as interview progressed. From extant literature survey, knowledge and information gained that is presented in this thesis was considered as reference for assessing whether a particular management construct is understood and applied.

Explorative interviews generally lasted 60 to 90 minutes with some interviews going into two sessions. During the interview casual observations on general business practices were also made. The interview was specifically related to strategic entrepreneurship. The idea of superior returns and gaining competitive advantage was considered important and strategic entrepreneurship as was incepted and augmented in this thesis was in general profoundly acceptable and practical to almost all the respondents.

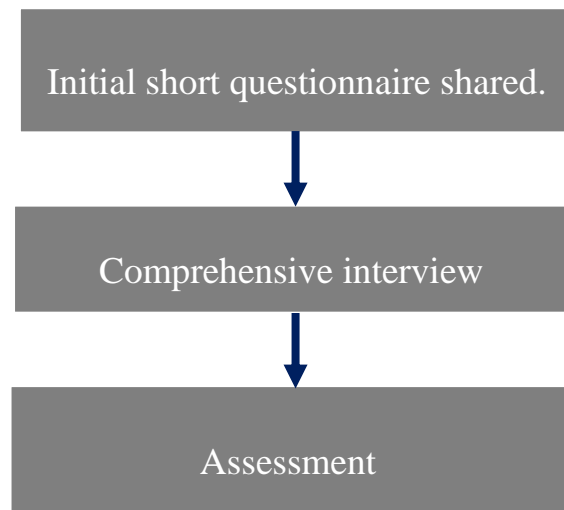


Figure 14 Survey-Interview flow

An initial questionnaire shared is required to be filled before the actual meeting for the interview. Questions check the extent of the desire the manager has for the SE element, the extent the firm prioritizes the element and whether they practically exist in functioning format in the firm. The assessment is required to be graded or measured qualitatively on a scale of “very less, less, neutral, high, very high.”

Format of Initial short questionnaire

Table 4 Pre-interview questions

Strategic Entrepreneurship Dimensions		Is it Desired	Is it Prioritized	Is It Existing
		Self-Rating	Self-Rating	Self-Rating
Original Construct				
	External Networks			
	Resources and Organizational Learning			
	Innovation			
	Internationalization			
	Entrepreneurial mindset, culture, and Leadership			
Augmented construct	Creativity	Employee and Organizational Creativity		
		Design Thinking		
	Dynamic Capabilities	Strategic Foresight		
		Business model Innovation		
	Digitalization In manufacturing	Advance Manufacturing		
		Value Chain Management		

12.3. Extensive Interview.

Extensive interviews begin with formal discussion building and gradually building the discussion around the SE Topics and elements. A set of pre-determined questions is formulated as guidelines to deep dive or direct the discussion during the interview phase to extract relevant information.

The following set of questions were considered:

- Exploitation and exploration: Questions related to the activities and actions the firm directly performs for identifying opportunities and for exploring new avenues of revenue stream or firm positioning against the market forces.
 - Methods and actions employed for identifying new income streams.
 - Number of new income streams identified in the last 5 to 10 years.
 - Number of new income stream predicted for the upcoming 5 years
 - Methods and action employed for extending existing products and services in new market segments or new domains.
 - New market segment identified? New market segment predicted?
 - Technology scouting and market analysis for the existing product folio is conducted. What technique is employed and Confidence level in the analysis and prediction techniques employed?
 - Exploration techniques employed.
 - How are ideas identified and evaluated? Any technique methods employed?
- Strategic Resource Management: Question related to activities firms perform to develop capabilities from competitiveness perspective. How are Strategic weightage for competence and capabilities development in different streams of business and how orientation of resources is developed for simultaneous use of exploitation and exploring of opportunities.
 - Strategic weightage for organization and operation of teams for competitiveness. How much weightage does the managerial team (top/middle/supervisor levels) realize?

- How Competence and capabilities perceived and monitored or developed?
- Current Scale of competence development
- Are resources identified and aligned for exploration or exploitation of opportunities?
- Financial (innovative or strategic) model employed to manage innovation and co-development activities.
- [Effectiveness of financial model to sustain investment in entrepreneurial pursuits or activities]
- Is future competition, threats disruption identified?
- Awareness of exiting SWOT of business model, organization, product/service portfolio
- Is the firm capable of attracting competitive human talent, ii. secure supply of critical component/material at competitive price? iii. Establish effective marketing channels?
- **Entrepreneurial Culture and Leadership:** Questions regarding experimenting and risk-taking capabilities. Broader vision and encouragement for innovation. Strategic weightage for Entrepreneurial orientation. Methods adopted to promote creativity, continuous innovation, and flexibility.
 - What are enterprise level efforts for promotion of innovation?
 - Extent of Top management involvement in innovation promotion
 - Role adopted by leadership in activities related to innovation.
 - Role adopted by leadership in research and development activities.

- **Network and alliances:** Questions Strategic collaborations, alliances, and partnerships with external firms within same geography and different geographic locations (international)
 - New networks have been established in the last 5 years? New networks forecast?
 - International alliances? Purpose of alliance technology procurement, new geographical market new source for critical components?
- **Supply chain management:** Explorative strategies adapted to develop and nurture the supplier base for the critical components or process.
 - Disruption experienced due to lack of critical components/materials in recent years? Alternate sources for critical components identified?
 - Sourcing methods adopted [single source/multiple sources]. How is Supplier competence evaluation performed?
 - Level of inventory of critical components or material. Cost of disruption
- **Creativity:** Questions related to creativity in business processes, creative exploration either resulting in incremental or radical innovation. Business model regeneration, Business ecosystem orchestration and lastly design thinking.
 - How is innovation achieved?
 - Creativity in management and implementation of financial practices monitoring cashflow, budgeting, and funding noncommercial strategic activities.
 - Strategic weightage for creativity
 - Perspective on business model employed.
 - How are customer needs and requirements identified?
 - Is Design thinking practiced?

- **Advance Manufacturing and Digitization:** Outlook for digitization of process and adaptation of advanced and moder manufacturing methods and machines.

- How is digitization of process viewed? Digitization of organizational process considered.
- Flexible manufacturing adapted or considered.
- Digitization as a competitive advantage is considered as possibility.
- Digitization as an explorative tool for new business opportunities?

- **Dynamic Capability and Business model:**

How is the development of dynamic capabilities tried? [How capabilities to reconfigure and realign business to the market changes as perceived by the firms]

- How are business opportunities sensed in changing business environment?
- How are business opportunities seized in dynamic markets?
- The perceived extent of business reconfiguration achieved in recent past.
- How is Business model evaluation and regeneration performed? In Response to changes (Is the response “a reaction or there is some “pre-action” before changes)
- Is business model adopted able to appropriate value to its activities? Are there economic returns for the activities performed.
- Strategic foresight practiced? Is there awareness of strategic foresight methods and tools?

- **Value Chain Management**

How the value chain is developed, maintained, and operated in the current organization structure.

- Supply Chain model implemented and its effectiveness?

- Digitization of supply chain part of strategy?

12.4. Assessment done during the interview:

Strategic Entrepreneurship Dimensions		Desired		Prioritized		Existing	
		Self-Rated	Assessment	Self-Rated	Assessment	Self-Rated	Assessment
Original Construct							
	External Networks						
	Resources and Organizational Learning						
	Innovation						
	Internationalization						
	Entrepreneurial mindset, culture, and Leadership						
Augmented construct	Creativity	Employee and Organizational Creativity					
		Design Thinking					
	Dynamic Capabilities	Strategic Foresight					
		Business model Innovation					
	Digitalization In manufacturing	Advance Manufacturing					
Value Chain Management							

Table 5 Ratings during interview

Degree of parameter exhibited during interview considered in four range: very less, less, medium, high and very high

12.5. Advantage of Explorative interview:

- Context of the business and products or service of the firms can be understood and sensible assessment with respect to the context of the business and product line could be made.

- Explorative interview provides a chance to evaluate and talk about the decision-making process and rationale behind the decisions that is generally taken within the firms.
- Where required greater clarity on a specific topic can be gained and the outlook of the firm towards that topic can be understood. Which helps in assessment.
- A broader set of questions can be considered during explorative interviews.
- Due to the lengthy nature of the interview, there is ample time to observe the respondent more closely and analysis his perspective business decision making. In the current context it is strategic management.
- As time progresses, respondents are naturally inclined to be more open and honest. Obviously, enthusiasm level and interest must be sustained throughout the interview. Deliberate efforts are required to be made in this regard.

List of interview participants:

Overall 22 interviews conducted details are as follows:

Name	Designation and Role in Organization	Organization Name
Anil Varma Addepalli	Director Operations	Neogen Engineers India Private Limited
Sagar Gujarathi	Assistant Manager and Sustainability, Procurement and Transportation Management	Bridgestone India Private Limited
Aditya Bhujbal	Senior Executive Project Management	BHTC
Shounak Kulkarni	Manager operations	Kupsa coatings pvt ltd
Onkar Madhekar	Business Manager	EDS Technologies Pvt Ltd
Sunil Kumar Sar	Senior Manager-Operations	Tata ERC (Small Subsidiary of TATA Motors)
Suresh Nikalaje	Manager Technical Support	Dassault Systèmes -india subsidiary
Abhay Ghosalkar	VP sales	Stealth Startup
Sashikanth Reddy	Business Owner	Dhruv Shakti Electronics
Aniruddha Wasade	Manager-Operations	Sandvik
Nikhil Borawake	Managing Director	Borawake Orthopedics
Venkat Gannu	Managing Director	Thirumulla Chimneys
Classic Plasto Craft MD	Managing Director	Classic Plasto Craft
Mr Ventaramana	Managing Director	Krown UPVC Solutions
I Anil Reddy	Managing Director	Manikanta engineering works
Amit P	Managing Director	Rajeshree Enterprises
Sushil Korde	Managing Director	S K ENGINEERS
Nirmalya	Manager Engineering	Wabt c
Venkatadri	Head -engineering	Alstom transportation
PRASANT MADDAMSETTY	Managing Director	Ananth Sai Engineering Works

Table 6 Candidate list

12.6. Interview survey and assessment [few examples]:

Below two tables show how the format was utilized. The tables considered are for two manufacturing firms Neogen Engineering and Classic plasto craft.

Firm Name: Neogen Engineers India Private Limited						
	Desired		Prioritized		Existing	
	Self-Rated	Assessment	Self-Rated	Assessment	Self-Rated	Assessment
External Networks	High	High	High	High	Very Less	High
Resources and Organizational Learning	High	Less	Neutral	Less	Very Less	Less
Innovation	Neutral	High	Less	Less	Very Less	very less
Internationalization	High	High	Less	Less	Very Less	Less
Entrepreneurial mindset, culture, and Leadership	High	Less	Less	Less	Les	Less
Employee and Organizational Creativity	high	Less	Neutral	Less	Less	Less
Design Thinking	Neutral	Less	Less	Less	Very Less	Less
Strategic Foresight	high	Very less	Neutral	Very less	Neutral	Very less
Business model Innovation	High	Very less	High	Very less	Neutral	Very less
Advance Manufacturing	Very High	Very High	High	Very High	high	Very High
Value Chain Management	Neutral	Very high	Neutral	Very high	Less	Very high

Firm Name: Classic Plasto Craft						
	Desired		Prioritized		Existing	
	Self-Rated	Assessment	Self-Rated	Assessment	Self-Rated	Assessment
External Networks	very high	high	very high	high	high	high
Resources and Organizational Learning	high	high	neutral	neutral	neutral	less
Innovation	high	high	high	neutral	less	less

Internationalization	very high	high	high	less	less	less
Entrepreneurial mindset, culture, and Leadership	very high	high	high	neutral	high	less
Employee and Organizational Creativity	less	less	less	less	less	less
Design Thinking	very less	very less	very less	very less	very less	very less
Strategic Foresight	high	very less	high	very less	high	very less
Business model Innovation	very high	high	very high	less	high	less
Advance Manufacturing	very high	high	very high	high	neutral	high
Value Chain Management	very high	high	very high	high	very high	high

12.7. Results: Comparative assessment

	Is it Desired		Is It Prioritized		Does it Exist	
	Self-Rated	Assessed	Self-Rated	Assessed	Self-Rated	Assessed
External Networks						
Very Less	5%	5%	5%	5%	9%	5%
Less	5%	14%	18%	23%	9%	23%
Neutral	27%	18%	18%	32%	27%	41%
High	45%	64%	45%	41%	50%	32%
Very High	18%	0%	14%	0%	5%	0%
Resources and Organizational Learning						
Very Less	0%	0%	0%	0%	5%	0%
Less	5%	23%	5%	36%	23%	64%
Neutral	14%	18%	27%	23%	18%	5%
High	68%	59%	59%	41%	50%	32%
Very High	14%	0%	9%	0%	5%	0%
Innovation						
Very Less	5%	5%	5%	5%	9%	14%
Less	5%	9%	14%	55%	36%	59%
Neutral	18%	9%	27%	23%	18%	9%
High	59%	77%	45%	18%	32%	18%
Very High	14%	0%	9%	0%	5%	0%
Internationalization						
Very Less	14%	9%	14%	9%	23%	14%
Less	14%	14%	18%	45%	27%	45%

Neutral	18%	14%	18%	27%	18%	23%
High	23%	64%	50%	18%	32%	18%
Very High	32%	0%	0%	0%	0%	0%
Entrepreneurial mindset, culture, and Leadership						
Very Less	0%	0%	5%	5%	5%	5%
Less	18%	59%	23%	64%	32%	73%
Neutral	23%	23%	27%	23%	27%	14%
High	41%	18%	36%	9%	32%	9%
Very High	18%	0%	9%	0%	5%	0%
Creativity						
Very Less	5%	5%	5%	5%	9%	18%
Less	5%	64%	9%	73%	14%	73%
Neutral	14%	5%	27%	5%	32%	0%
High	59%	27%	55%	18%	41%	9%
Very High	18%	0%	5%	0%	5%	0%
Design Thinking						
Very Less	14%	5%	14%	9%	18%	77%
Less	0%	91%	9%	91%	14%	23%
Neutral	18%	0%	27%	0%	27%	0%
High	55%	5%	45%	0%	32%	0%
Very High	14%	0%	5%	0%	9%	0%
Strategic Foresight						
Very Less	0%	14%	0%	18%	9%	86%
Less	9%	82%	14%	82%	14%	14%
Neutral	14%	5%	27%	0%	32%	0%
High	55%	0%	55%	0%	41%	0%
Very High	23%	0%	5%	0%	5%	0%
Business model innovation						
Very Less	0%	9%	0%	9%	14%	23%
Less	9%	50%	23%	73%	9%	64%
Neutral	18%	5%	18%	14%	32%	9%
High	45%	36%	41%	5%	36%	5%
Very High	27%	0%	18%	0%	9%	0%
Advance Manufacturing						
Very Less	0%	0%	0%	0%	5%	0%
Less	0%	9%	14%	14%	9%	18%
Neutral	18%	14%	23%	23%	36%	23%
High	59%	68%	55%	55%	36%	50%

Very High	23%	9%	9%	9%	14%	9%
Value Chain Management						
Very Less	0%	0%	0%	0%	9%	9%
Less	0%	0%	9%	14%	5%	5%
Neutral	27%	36%	27%	27%	23%	27%
High	45%	55%	41%	50%	50%	50%
Very High	27%	9%	23%	9%	14%	9%

Table 7 Assessment

12.8. Conclusion

1. Networking is highly valued and preferred strategy by Indian SMEs. Firms prioritize and do engage in creating external networks. In the considered cluster of SMEs interviewed it is observed that 41% have strategic networks existing in their current organization
2. Organization Learning concept remains poorly understood. Although many firm desires to have organization learning, they seldom achieve or have structure and process in place. In 64% there is no strategic structure in place to achieve relevant resources and organizational learning. It is observed that the managers do identify this lack and, in some firms, managers are now beginning to allocate strategic importance for organizational learning.
3. Innovation is highly desired and prioritized. But overall, SMEs are observed to produce less innovation. The intent for innovation is on average high, but there is less structural support provide to achieve it. Process innovation or innovation in marketing practices is also observed to be very nascently present in the cluster of interviewed firms.

4. Internationalization is desired by majority of firms, but deliberated steps or efforts are not observed to achieve internationalization. Internalization is observed to be high in intent among the SMEs interviewed. Internalization is believed to be at the beginning stages of future trend in the Indian SMEs
5. Entrepreneurial mindset is observed to be less present within the firms. A mind set for continuous exploration and exploitation of opportunities and aligning resources in that direction is not understood as proposed in literature and hence not implemented. Culture and leadership which orients firms entrepreneurially is missing in majority of the firms.
6. Creativity remains an abstract concept for majority of the firms and leaders. Employee and organization creativity is extremely poorly understood. Creativity in general is desired, but there are no efforts observed to achieve it in majority of the firms. Firm leaders are articulate about the requirement for creativity but are not sure about the methods or process to achieve it in their respective firms.
7. Design thinking, a creativity related tool for orchestrating strategies and new solutions, although highly advocated for engineering intensive firms is poorly understood. Firms and firm's manager could not relate to the actual definition of design thinking and methods and process described by these methodological thinking.
8. Strategic foresight a very powerful and relevant management construct is not understood. Almost all the firms assume strategic foresight to be synonymous

with strategic planning or future planning in general. Strategic foresight is not practice by any of the interviewed firms.

9. Business model innovation, in general firms give good priority for business model. But its concept in its entirety is not followed. The very fundamental tenant of business model is appropriation of cost of all the activities to capture value. Firms due to cost pressure fail to appropriate cost to all the activities. Cost pressure ideally would demand business model innovation but in many SMEs this is absent.
10. Advance manufacturing is highly desired and prioritized. Almost all the firms interviewed have sufficient investment in advance manufacturing. There is a strategic priority with allocation of required resources for digitalization. Digitalization is observed to be very high on agenda for the firms.
11. Value chain management is highly desired and prioritized. It is observed that a considerable amount of time is allocated to value chain management. Digitalization of value chain is also high on agenda and their existing strategy.

Strategic entrepreneurship is observed to be nascently followed. There is less awareness in manufacturing firms about management principles to organize structure and develop management routines. Among the considered manufacturing firms there is less awareness regarding developing creativity. Creativity is precursor to innovation, hence an important construct that needs to be honed. Strategic foresight which provides essential tools to navigate uncertain and ambiguous business environment is also less understood.

The framework developed in this thesis is relevant to business conditions SME face. The framework developed is practical pragmatic and implementable. It also provides a defined set of management constructs that needs to be followed.

Other Casual Observations

As business progresses, decisions, structures, or routines that are required to be developed in accordance with general management principles are not fully manifested. For example, a firm leader requires quantitatively ten objective decisions and actions to be made regarding the business aspect such as marketing strategy or business model, it is observed that firm leaders deviate by a small portion that is they take eight or nine decisions correct or as required. When business cycle proceeds further into increased challenging conditions there is more divergence between expected decision making and actual decision taken. Biases and project persistence (against business logic) starts to influence the decisions. It can be projected that as business progress the adherence to logical business decision mandate is deviated. Under pressure the decision rationale is not according to scientifically or theoretically developed philosophies [Which are developed and proposed for superior output].

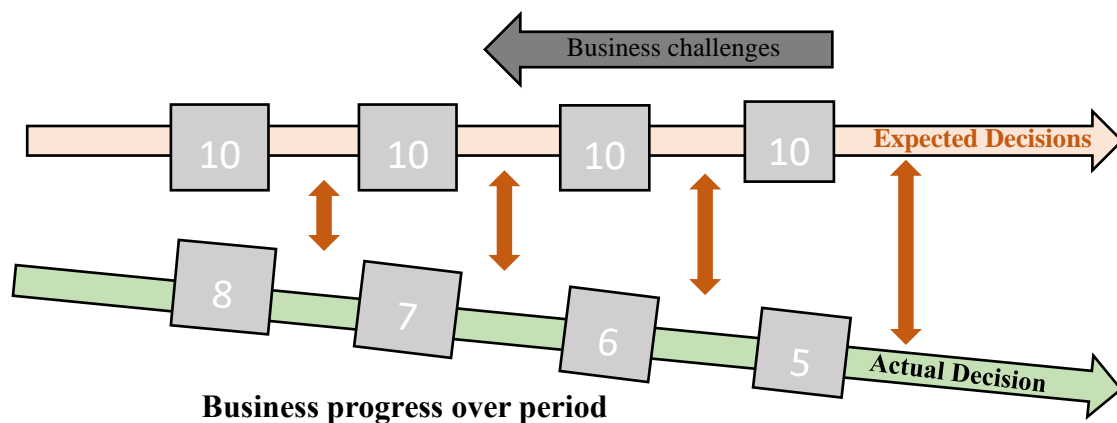


Figure 15 Deviation from expectation under challenging circumstances

One positive observation among the interviewed firms is their inclination towards digitalization and advance manufacturing. Firms are investing resources and time to develop digital capabilities in manufacturing. This is a good positive trend in Indian manufacturing firms. The government push for digital economy and digital ecosystem are facilitator for digitalization. The emergence of digital marketplace has also provided much need impetus for firms to invest in digital infrastructure. Advance manufacturing is now preferred by the firms and observed to be highly prioritized in firms' strategy.

CHAPTER XIII

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

13.1. Summary

The Strategic entrepreneurship (SE) framework considering the new business dynamics which are relevant to SMEs in manufacturing sectors especially in developing countries like India is proposed. It is argued that the SE framework as it was incepted and proposed was developed when firms were sailing through relatively stable or less dynamic environment. To make the concept and its construct applicable to the current environment three new elements within the ambit of SE are proposed in this thesis. These are creativity, dynamic capabilities, and digitalization. These three constructs so proposed are to enhance the firm's ability to innovate, to respond to changes and become digitalized as the world now become more digitalized.

How a firm and small-scale firm incorporate these constructs into their systems or routines is answered in this thesis. Through extensive literature review there are tools and methods identified are presented. Various research papers where reviewed the techniques and their observation related to their experience for using these tools and methods are produced in this thesis. There are arguments made to prove the applicability of the new constructs in context of strategic entrepreneurship and the prevailing business environment. Various arguments are produced to prove that the probability of getting a more favorable or superior outcome will increase drastically if the proposed constructs are considered within the greater framework such as strategic entrepreneurship.

Thus, with the arguments produced and supported by positive outcome as observed in various research papers quoted and produced in this thesis the new conceptual framework produced is relevant. The in-depth interviews conducted with SMEs and leaders in various small firms clearly indicate the lack of proper awareness and lack of methods and tools to design and build creativity and dynamic capabilities in the firm. Digitalization is observed to well accepted and practiced but the use of digitalization in context of competitiveness and exploration of business opportunities is required to be practiced and routinized. In depth interviews also revealed the inability of SME managers to consider the modern management tools to charter superior strategy for their firms. The tools and constructs of strategic entrepreneurship will enable the SME managers to orchestrate a superior strategy, process, and structure for their firm. The conceptual framework also can be considered as a consultative guideline for manufacturing SMEs.

Table 8 Conceptual SE framework

Strategic Entrepreneurship											
External Networks	Resources and Organizational Learning	Innovation	Internationalization	Leadership	Entrepreneurial mindset, culture, and	Creativity		Dynamic Capabilities		Digitization in Manufacturing	
						Employee Creativity	Organizational Creativity	Strategic Foresight	Business model Innovation	Advance Manufacturing	value chain management

13.2. Implications

Academically the concept of strategic entrepreneurship and its core elements are required to be reconsidered. Philosophically strategic entrepreneurship is the only managerial or management philosophy that improve a firms or leaderships ability to orchestrate superior strategies and entrepreneurial actions that increases the probability of superior business performance. The definition of SE is still observed to be evolving, the nature and the process of its manifestation in organization is not clear in literature. This provides ample room to broaden the core concept of SE and propose its application to various aspects of business. The current thesis does broaden at the conceptual level the horizon of the core elements. Structural, organizational, and strategic challenges faced by industries varies according to the segment the industry is in. A logistic company will have fundamentally different challenges than a marketing company. The current construct of SE is generalized for all industry segments. The new conceptual framework is developed for SMEs (Smaller size firms) in manufacturing sector considering the scare resources they have with them.

Industry leaders and managers of small firms or big firms are consistently required to formulate strategies that drives the performance of the firm. Bigger MNCs and bigger organizations have the access to the valuable information and know how to generate effective strategies. For smaller firms the access to know how is a challenge. If individual philosophies are considered for example “strategic foresight” there are questions under what context is this construct required to be considered and on business timeline when can this be considered? For SMEs answering this question would not be straightforward. The

SE framework developed makes the various constructs systematically implementable in three main contexts which are firm's competitiveness, firms' ability to explore new business opportunities and firms' ability to exploit the identified opportunities. No new radical inherent competitiveness is required to build up. The managers and leadership are required to get skilled in implementing and practicing of the various methods and tools proposed in the framework. These skills are easily developable and implementable. Special skills like creativity and design thinking can be sourced externally at competitive cost.

Logic driven decision making ability in context with business decision by business leaders will help their firm navigate challenges, mitigate risk, and exploit opportunities. The Conceptual framework developed herein will provide SME managers and leaders a decision-making logic and guidelines in strategy development, in building capacities and capabilities in the firm, in developing business model that enables firm to capture all the value it is able to generate. Framework considered increases the probability of sustained superior outcome for manufacturing SMEs. It will help managers generate information before the competition or rival firms does. The conceptual framework will help managers to make decisions on the information produced that will enhance their firm's competitiveness.

13.3. Recommendation for future research

Current thesis concentrated on a small cluster of SMEs in manufacturing sectors. The themes selected were predetermined and were based on SE construct. Greater deep dive is required to be made in understanding the nature of innovation that the SMEs are capable of. Innovation in general is observed to be less in Indian SMEs. Managements

desire and intent to provide the required resource support is high. But the actual manifestation of innovation is not realized. The underlying reasons are required to be identified. Explorative study concentrated on smaller industrial firms is required. Further a comparative analysis between the SMEs in developed nations and Indian SMEs is required to identify organizational gaps for successful innovation.

Creativity remains vaguely understood and adopted. Creativity is now highly prioritized in bigger Indian OEMs. Design courses have now been offered at top technical universities in India. How exactly creativity can be organized, planned, and propagated in organizations in business context and in business decision making context at management level is required to be studied in detail. In this thesis design thinking one of the creativity related tools for managers or at management level was presented. More such tools needed to be developed or identified in business context. Management must be creative to navigate the negative forces that reduces firms' performances. Research on applicability of creativity to different business decision must be conducted. There is ample of research of psychological perspective how creative manifests in teams and individuals. There is ample of research what type of cognitive mechanisms are present for creativity with creative people and with teams of creative people. Management literature and industry leaders of big or small would benefit if studies related to "management for creativity" are published more. Management for creativity should be in future core skills for managers both in SMEs and large corporation. In the current context further studies for creativity tools that can be used by managers for "management for creativity" in context with business decisions should benefit and improve decision making skills.

Quality of managerial decision-making ability impacts firms' performance. For SME sector where there are not many functions or there are not many levels of hierarchies the onus of decision-making is on selected few managers or leaders. Biases and tendency to have "personal choices" against established business logic is observed to be high. It is essential and management literature would benefit if there were quantitative research conducted exploring the nature of biases that exists and the underlying reasons for their existence. Development of dynamic capabilities within the organizational routines require unbiased and rational decision-making capability. Under challenging circumstances, the wrong decision will have fatal impact. The decision-making behavior of leaders and managers is recommended to be studied when their respective firms navigate challenging business environment. Quantitative exploration in the decision-making pattern of leaders and managers will help establish factors that influences the choices or decision the managers and leaders make and the strategies they develop or adapt.

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APPENDIX A

SURVEY COVER LETTER

Indian manufacturing currently struggles to remain competitive under dynamic market conditions. Startups and SME performance in manufacturing sector remains poor compared to IT sector. IT sector has advantage of geographical diversity spread that is they are in multiple countries and hence have seamless access to modern management practices in organization and operations of business process. Manufacturing sector on the other hand is challenged due to the local Micro-macroeconomics and heavy cost competition from Chinese companies. Profitability and superior business performance remains elusive to majority of the firms. Zero or lower profit margins remains the condition of majority of the SMEs. Strategic Entrepreneurship from management literature should provide a beneficial operational and organizing strategies and methods to gain superior returns and sustain financial performance under dynamic conditions. Strategic entrepreneurship essentially can be considered as a creative combination of strategic management principles and entrepreneurship principles to achieve superior returns and generate wealth. In management literature there are general concepts provided for practice of strategic management, but no specific methods of framework exist for SMEs in manufacturing sector. Currently no framework specific to manufacturing sector and in developing country like India exists.

This research will perform systematic literature survey and review to identify new evolving theories, constructs, tools and methods for exploitation and exploration, identification of opportunities, strategic positioning, and entrepreneurial management of manufacturing systems to propose an implementable prescriptive framework for Strategic entrepreneurship for SME in manufacturing sectors in India. Interviews will be conducted to understand the dominant management practices in various business dimensions, to understand

management challenges and bottlenecks in practicing aggressive and more relevant management methods and processes.

Objective of Interview

In depth Interviews of Leadership and managers involved in strategy formulation and execution will be conducted. Manufacturing firms involved in either providing manufacturing as service or manufacturing a product are being considered. Primarily Small and medium enterprises are considered. Actions or systems manifesting the following business activities are analyzed and observed. These business aspects considered are essential dimensions of strategic entrepreneurship.

- Business opportunity exploitation and exploration,
- Strategic Resource Management
- Entrepreneurial Culture and Leadership
- Network and alliances.
- Agility in supply chain
- Creativity practice
- Dynamic Capabilities and Business model
- Advance Manufacturing and Digitization

It is assumed that not all the dimensions of strategic management are practiced or not all dimensions of management aspects are practiced. The objective of the interview is identifying management patterns in Indian SMEs with respect to the above-mentioned topics. Some topics may not at all be considered by a firm, some partially considered.

The existence of the firm and existence of economic rent of the firm proves the existence of certain management practices. The objective is not to understand these management practices as this may impinge firm specific know-how. Objective is to identify the extent of the tenets of strategic entrepreneurship in the management pattern.