PROPOSING A PROCESS MODEL TO DEVELOP A SUSTAINABLE MECHANISM FOR UNIVERSITY–INDUSTRY-GOVERNMENT LINKAGE: AN ACADEMIC MANAGEMENT PERSPECTIVE

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DEDICATION

I would like to dedicate this thesis to my beloved parents who have been a great source of inspirations throughout my life and they have provided a lot of moral support to me and enabled me to become what I am today. My wife also supported and courage’s me that never give in. I would also like to dedicate this thesis to my honorable teachers who gave me precious knowledge.
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ASIF MEHMOOD RANA
ABSTRACT

A linkage between universities and industry have been extended, but rather haphazardly researched. These arrangements usually concentrate on the flow of such knowledge is need of industry. While the popularity of such arrangements between universities - industry and government is, especially given their relative novelty and policy visibility, overemphasizing such mechanisms does not do justice to equally if not more important, although indirect, linkages between academia – industry and government. The objective of the study is to examine the linkages and factors influencing the relationships between universities- Industry-government in Pakistan. A proposing conceptual model to process sustainable mechanism to improve the linkages among government, universities, national research institutions and firms, in order to enhance innovation and competitiveness in the industry. Present research is to identify the relationship dynamics among industry, government and universities and redefine the role being played by academia to enhance its productive contribution in the contemporary knowledge based economy, and improve its ability to meet the dynamic market demands. Considering the underlying research purpose, the researcher has chosen the interpretive philosophical approach to qualitatively analyze different dimensions surrounding the underlying phenomenon. The interpretive approach suits well while evaluating the three-dimensional relationship between industry, academia and government. Collecting the general information about the current linkages and detailed investigation along with probing strategy would highlight the gaps between industry, academia and government linkages. Such perspectives can only be explored by employing the qualitative approach. Primary data sources for the underlying research include in-depth structured interviews.
with the higher education institutions and senior management from the corporate world. Content analysis and NVIVO were used for analysis of qualitative data to find out the major opportunities and challenges to fill the gap. During depth interviews many problems were highlighted, a list of most repeating opportunities as well as challenges has been discussed in the result. Universities stay with a low level of collaboration with the industry, both constructing agents and industry. The findings on university-industry-government linkages observed to commend themselves that they should deliver graduates progressively important to industry and government needs, while government and industry should bolster finance for research and advance development, and also participate to grow new innovation. In addition, government ought to have a clear policy heading to help the industry. On the bases of findings, this study proposes a conceptual model to develop a sustainable mechanism for university – industry – government linkages and other authorities. This research is helpful for the policy makers who can use it for establishing the mechanism among university - industry - government linkages in perspective of management and policies regarding in Pakistan.

Key words: University, model, industry, Process, policy, Government, management.
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CHAPTER 1

INTRODUCTION

1.1 Background

The last two decades have observed major transformational changes within science and society. The on-going transformations within both fields counter influence each other, resulting into major revolutions in modern society. These scientific and societal changes have influenced almost every sphere of life, particularly the corporate world. The modern business world has experienced organizational reform, where the traditional, rigid, isolated and inflexible organizational modes are being replaced by modern, flexible and interconnected structures. Considering the non-linear interrelated relationship nature, the patterns and forms of this relationship building have diversified. Benefits for all stakeholders; academia, industry, government, Intelligentsia and society.

It is local need to improve the existing mechanism of university, industry and government collaboration to excel the corporate sector, according to international peace. Academic sector produces the basic knowledge that requires careful consideration while applying the real-world context. Human Capital runs the corporate sector, Source of human capital and knowledge is universities, A mistrust has emerged between universities and industries due to weak linkage and lack of proper mechanism. In Pakistan, common statement used to saying “Theory is an entirely different thing as compared to practice”.

Why intended to do this study? (i) Local Context (II) Gap Existing in Practices. Looking into recent history, the higher education commission is trying to reduce this gap after
major reformation in universities in 2002. Today, the academic institutions are struggling for the industrial funds within the highly competitive environment. Therefore, this study addresses the weak linkages of academia-industry-government in local context.

Today, the learning and knowledge accumulation occurs at the individual level as well as through interpersonal cooperation. The individual learning occurs through experience-based learning, experimentalism and exploration (Fisher, 2000), whereas, learning through interpersonal cooperation occurs through observation or interaction (Lundvall, 1998). Schnibany et al. (2000) comment that individual learning limits the knowledge acquisition to a single person, whereas, the learning through interpersonal communication and cooperation results into knowledge acquisition and amplification. The increased reliance on the knowledge acquisition coupled with escalating environmental complexity motivates the modern organizations to strengthen their relationships with the external environment beyond the dependence on the internal competence. The knowledge accumulated through dynamic diffusion and production processes promote the technological change. The network of system innovation approach (NSI) places the central importance to these technological transformations (Freeman, 1987; Lundvall, 1992; Nelson, 1993; Edquist, 1997). Technological innovation is one of the important determinants of growth and productivity at the organizational and national stage (Lundvall, 2016). The next section explains how the on-going environmental transformations have influenced the interaction between Universities and business firms for successful knowledge management.
1.1.1 Interaction between Universities and Business Firms

The collaboration between corporate sector and academia has been a high matter of concern within the industry and academic circles. Various organizations like EU (European Union), OECD (Organization for Economic Co-operation and Development), SARC (South Asian Association for Regional Cooperation), and also place the central importance to this classical theme while developing their agenda. The academic knowledge not only results in the written knowledge, but also the tacit knowledge by broadening the understanding of graduates and researchers. However, the production of knowledge is not useful, until it is successfully transferred from the academic to the corporate settings. The application of theoretical knowledge in the real world depends on the cooperation between university and industry (Schön, 2016). However, the holistic view of underpinning reality suggests that such knowledge flow is never an easy goal, as it involves various multifaceted factors that facilitate or hinder the knowledge transfer process (Schartinger, 2002).

These multifaceted factors, mostly include research outcome, industrial and managerial expertise and resource availability. It is traditionally assumed that the academic sector produces the basic knowledge that requires careful consideration while applying the real-world context. In many cases, the academic knowledge lacks the latest skills that are required in the commercial sector (Salazar, 2011). Hence, the communication and cooperation between industry and university are inevitable for both sides. The factors that motivate the industry to collaborate with the academia include escalating competition, increased reliance on the innovative knowledge, rising research and development costs and shareholders’ expectations to maximize the profitability besides ensuring the long-term survival. Nordfors et al., (2003) mention that many organizations are stripping down their huge research laboratories in response to the internal and external environmental pressure.
The above discussion suggests that both, academia and industry are in need to communicate and cooperate with each other. The relationship and interaction between academia and corporate world must be regulated and institutionalized to eradicate the cultural conflict and spread the benefits to society. The state intervention has become common in cases where a large gap exists between the industry and the university. The governments are realizing the importance of this cooperation for strengthening the national innovation system (Nordfors et al. 2003). Hence, the university-industry interaction can strengthen the whole innovation system besides addressing the issues of both sides.

1.2 Triple Helix Model as an Essential Prologue

The modern economies that extensively rely on the knowledge creation and management face various challenges in modelling and measuring the knowledge (Gold, Malhotra, 2001). This research study aims to resolve those challenges by employing the triple helix model. This model helps the researcher in understanding the relationship dynamics of industry-academia-government partnership (Etzkowitz & Leidesdorff, 2000). The inter-relationships enable or hinder the communication system that provides the dynamics of the overall system (Gibbons et al., 1998; Luhmann, 1999). Within the broader relationship dynamics, certain sub-dynamics span and strengthen the overall knowledge based innovation system, including knowledge organization, geographic variation and economic exchange within the market. The organized production of knowledge disturbs the historical organizations (Foss, 2007, Hansen, 2001). Principally, the wealth could be generated from the knowledge dissemination within the market.
However, the global knowledge dissemination process must be geographically localized for maximizing the effectiveness (Krugman, 1996).

Within the political economy, the innovation generates the differential production puzzle. Different economic areas develop at varying pace (Nelson & Winter, 1973, 1976). The well-balanced mechanism solves these production growth dilemmas. Previous researchers report that within the 20th century, the knowledge production and dissemination process became more controlled and organized (Noble, 1977; Whitley, 1984). Today, the upsetting innovation forces cannot thrive within the complex institutional arrangements of the political economic system. The above mentioned sub-dynamics that continually develop recursively along the axis interact within intricate dynamics of a knowledge-based economic system. The analysts regard the emerging order-system as the technological regime. Whereas, the knowledge based economic system thrives in the form of communications through diversified networks. Dosi (1999) comments that the modern technological regime contains different trajectories that could be balanced where 2 of 3 sub-dynamics co-evolve, while third sub-dynamic knowledge based system become constant into the overall regime. Within this technological regime, the political economic system offers the support in the form of institutional infrastructure (Dosi & Nelson, 2016).

1.3 Problem Identification

Industry-academia cooperation is being considered as a tool and strategy for strengthening the R&D (research and development) capacity building in Pakistani organizations. The Pakistani enterprises and universities are demonstrating a willingness
to increase their investment in research and development activities, and use the R&D as a tool for making academic research more relevant and useful for fulfilling industry expectations. The thirst for effective knowledge management through cooperation with each other is based on the vision of transforming the Pakistan to the global knowledge-based economy. The business community realizes the need to develop strong linkages with academia for fostering and embedding the innovation into their organizational culture.

Compared to the developing world, the developed western states have established a strong research culture within their academic institutions, consequently resulting in more useful and productive academic knowledge. It is identified that research culture is under-developed and linkage between the academic and corporate world is weak in Pakistan. Such weaknesses hinder the successful knowledge transfer. It also influences the innovation embeddedness within the overall system. It is one of the main reasons, why the Pakistani firms face highly tough competition at the international stage and face difficulty in developing the innovative, customized products as per international quality standards (SCCI, 2015).

Looking into recent history, the higher education commission of Pakistan introduced major reformations in the universities in 2002. The first decade of the 21st century brought positive changes within the Pakistani academic world. The government sent thousands of scholars abroad for higher studies. Unfortunately, many scholars decide to stay abroad after the degree completion. The government minimized this risk by formulating the contract with the scholars going abroad. However, one weakness that still remains there is that higher education commission has not set any specific criteria for the
quality and quantity of research base publications during the completion of the doctoral degree and serve the society at large.

Ankrah (2015) suggests that academic researchers exploring the industry-academia linkage, mostly focuses on limited industrial and technological fields, such as pharmacy, chemical industry, ICT and biotechnology (Pavitt, 1984; Cohen, Nelson & Walsh 2003; Rappert, Webster & Charles 1999; Faulkner & Senker 1995; Meyer-Krahmer & Schmoch 1998). These sectors require a close industry-university coordination as the scientific knowledge is essential, yet, inevitable for their development and sustainability (Bonaccorsi & Piccaluga1994, Geisler 1995). The researchers argue that the firms that operate in highly knowledge intensive industries and require the research and development input in their production process seek to develop an active interaction with the universities and other knowledge centers. On academia side, those universities show a willingness to collaborate with industry that seeks to decrease their dependency on the public funding (Guimón, 2013). Such resource dependency urges the academic institutions to expand their access to the additional resources (Bozeman 2000; Mora-Valentin 2000; Carayol 2003). However, Slaughter & Leslie (1997) comment that this explanation is inadequate as besides resource dependency, many other factors also motivate the universities for developing interaction with the industry. The researchers further argued that the research groups that get the adequate public support are more likely to get the research funding from private sources. Hence, understanding the holistic context is important while passing the reformations related to industry-university linkages. Pollitt & Bouckaert (2000) comments that the research publications don’t explain the contextual difference and mainly focus on the “characteristics of the reform
instruments”. Csizmadia (2006) comments that modern academic management focuses on the quality management aspects and pays a little attention to the specific organizational characteristics. Present study assesses the response of institutions to develop the university-industry linkage considering the recent need of government reforms.

1.4 Problem Statement

The underlying research investigation efforts to fill the gap in the existing body of knowledge by focusing on the weak areas of higher education institutions and strengthen the research and development, while developing cooperation with the industry. It is important to analyze how the institutions are currently using the government resources and what is the consequent impact on the educational quality, stakeholders and overall society. Small budget to R&D shows the government priority setting, academia's role in national research capacity, collaborating activities including networking, patenting and training and industry linkages for education and knowledge parks are lacking elements. This study develops a conceptual framework for University-Industry-Government linkages and present to solve the future challenges. Mostly, the governments enthusiastically make the major announcements, lack the motivation to keep an on-going evaluation of the implemented measures. It is important to understand why and how the institutions manage the quality-based management mechanism in university-industry-government linkages. The underlying research explores the issue by conducting in-depth interviews with government officials and industry and academic representatives.
1.5 Research Question

The researcher has formulated following research questions to explore the dynamic linkages between industry and university within a knowledge-based economy:

1) What are existing issues in university-industry-government linkages?

2) How to describe the role and concept variables of the university-industry-government linkage and quality based management approach?

3) What is the nature of existing mechanism of collaboration among university - industry-government in Pakistan?

1.6 Objectives of the study

1) To develop a sustainable process model for University-Industry-Government linkages to further improve the collaboration between institutions in relation to management approach.

2) To provide the quality based management and research scheme to foster and pave the way for the knowledge based economy.

3) To build the mechanism and streams for enhancing the university - industry and government linkages, in order to improve the industrial differential advantage.
1.7 Significance of the Study

The research findings will broaden the understanding of current industry-academia-university relationship dynamics within the context of Pakistan. The results will discuss the development of mechanisms for transferring the competencies and knowledge from academia to industry. The environmental complexities urge the industry and academia to close the gap and strengthen the cooperation for effective knowledge capitalization and management (Tim Minshall, 2016). The findings will help the academicians and practitioners in strengthening the linkages between universities and industry and provide the basis for impactful knowledge generations. Lastly, study findings proposed by this study will broaden the understanding of the knowledge based industries within the developing economic structures. The contemporary business organizations seek to develop multiple connections with the society and surrounding environment to ensure the long-term survival (Lundvall, 2002).

The networking and alliance with the industry and other knowledge centers have become crucial for allowing a smooth and flawless knowledge flow (LIU, 2009). The research will further extend the existing body of knowledge within the area of economic development, competitive strategy, public policy, organizational development, government-industry-university interaction and higher education. Application of research will play vital role through theoretical knowledge in the real world to enhance the cooperation between institutions in relation to management. The outcomes will help the academician and practitioners in strengthening the linkages between universities and industry and provide the basis for impactful knowledge generations in order to enhance the industrial differential advantage.
1.8 **Scope and limitation of the study**

The researcher intends to enhance the current conceptualizations of knowledge transfer and recommends innovative perspectives of relevance for comprehending the cooperative associations within University- industry context. The study also highlights the future research areas for extending the discussion in a meaningful manner. The researcher aims to ensure substantial contribution to existing literature on university-industry interaction. The study limitations and contributions are stated within this research context. The review of the University, industry literature suggests that the current body of knowledge about the academia, university interaction is mostly data driven and fragmented (Slaughter & Rhoads 2004). The review further suggests that less number of integrating analytical models are available that could describe the core aspects of industry-university linkage as a social phenomenon (Thune, 2006).

The underlying study makes the practical contribution by sorting out and discussing the important theoretical aspects based on in-depth theoretical and explorative research. Hence, this research aims at broadening the existing university-academia literature by explaining the core theoretical aspects, and by linking the topic to the wider literature on knowledge exchange and inter-organizational relationship dynamics. Overall, the existing University industry literature lacks the micro-level data. Particularly, the dearth of literature exists about how universities interact with the industry in the real-world context. The main discussion is about the processes of creating, developing and disseminating the knowledge through effective interaction (Gulbrandsen, 2003). The in-depth understanding of these processes requires micro-level, qualitative information that could explain the micro-cosmos of multidimensional knowledge interaction, which is
misunderstood at often. The micro-level research within the University industry, academic literature is regarded as the promising approach for future research (Mora-Valentin, Montoro- Sanches & Guerras-Martin, 2004).

1.9 Researcher Contribution

A propose process model to develop a sustainable mechanism for strength the University-Industry-Government linkage. It will create the value in existing systems, upgrade the existing linkage and provide the guild line for policy makers, industry managers and academic leaders. The Major contribution of the underlying research is to generate the required micro-level data regarding the interaction process. The researcher explains how the academia and industry interact and make the collaborative research and development efforts. The researcher identifies the complementarities between the core and desired functions, for example, between mentoring and teaching and enhanced industrial relations. This knowledge enhances the understanding of the interaction between the private sector and university faculty.

The present study contributes to provide the policy road map for three players. Productivity will be increase through University Industry interaction. The underlying research recommends that streamlining the problem to the productivity can lessen the influence of the specific behaviors, endowments and characteristics of university faculty that consequently increases the intensity and chances of collaboration with industry. The modern academic reward structure focuses on the engagement with the student and places less importance on the traditional role of university faculty. Today, the academic institutions are struggling for the industrial funds within the highly competitive environment. The HEIs (Higher Education Institutes) are seeking to develop close
linkage with the industry. The changing environmental scenario requires the scientists to reposition their role for claiming and utilizing the rewards from the active interaction with industry. Based on the theoretical and qualitative analysis, the researchers focus on the particular mechanism through which the private sector can utilize the skills of university faculty. Although the scholarly ability is important that is evaluated through the number of publications, it doesn’t explain why and how the interaction with the industry occurs. The engagement with the students is one possible mechanism that could be used by scientists to develop interaction with the private sector. The results have practical implications for the university administrators, educationists, policy makers and stakeholders interested in the economic development and technology transfer.

1.10 Layout of the thesis
The researcher has developed the following thesis structure for the successful accomplishment of study aim and objectives:

Chapter 1 “Introduction” has provided an overview of the whole research by stating the research rationale, aim, objectives and significance.

Chapter 2 “Literature review” offers the theoretical foundation to the underlying research by reviewing the past scholarly studies and formulating the research hypotheses.

Chapter 3 “Research methodology” state the important methodological components. The researcher explains the chosen research methods for conducting primary and secondary research.

Chapter 4 “Results and Analysis” present the key empirical research findings. The researchers conduct the comprehensive discussion of reported results to identify meaningful themes.

Chapter 5 “Conclusion”.....conclude the whole discussion by answering the research questions in detail and summarizing the accomplished research objectives.
CHAPTER 2
LITERATURE REVIEW

2.1 Psycho-Philosophy of Cooperation

The social science researchers emphasize the importance of understanding the factors that motivate people to cooperate with each other within group settings, regardless of the size of the group, society, community and organization. The management research studies confirm that the enhanced communication and cooperation between the organizational members positively influence the overall performance. Law research studies propose that the community disorder and rising crime rate issues become difficult to control when the local community does not cooperate. The political studies also highlight the significance of the societal involvement in developing and strengthening the societies. The public policy researchers also recognize the importance of cooperation during the policy making process (Guimon, 2013). The best example is the stakeholders’ policy-making groups.

Social psychological research studies focus on the importance of understanding why individuals are motivated to interact and cooperate with each other within groups and society. Particularly, the researchers within the social psychology field attempt to identify the motivational factors that are the real causes behind the voluntary cooperation. The aim of this research is to assess the motivational factors and in-depth psychology of cooperation. The researcher explore the motivations that influence the extent to which individuals cooperate within a group or society. Particularly, the research focus on the motivational factors that facilitate the voluntary co-operation within University industry
context. The in-depth comprehension of why industry and academia cooperate is necessary for strengthening the relationship between both parties (Leih & Teece, 2016).

2.1.1 Collaboration in the Real Corporate World

The researchers regard the issue of lack of teamwork as central to most of the issues faced by the modern societies, government institutions and bodies (Cremer, Zeelenberg, & Murnighan, 2010). Resultantly, the diversified fields such as political sciences, law and management attempt to understand the motivational factors that foster the cooperation between individuals as well as institutions. The modern researchers are increasingly interested to explore, which institutional design is perfect for fostering the cooperation. The perfect designs are those that can develop the strong linkages with the societies and other external environmental actors (Van Lange, Balliet & Van Vug, 2013).

Blader and Tylr (2003) comment that the work organizations facilitate the cooperation in a positive manner, such as fostering the team work, motivating to help each other by ensuring the extra contribution and cultivating the sense of collectiveness for the attainment of a shared objective. The sense of collectiveness and shared objectives decreases the chances of getting involved in acts that are personally rewarding, but harmful for the organization wellbeing, such as sabotage or stealing the office equipment. The highly positive influence of cooperation within the organizational context motivates the organizational behavior researchers to explore the dynamics that foster the cooperative culture at the workplace (Frey & Osterloh, 2002).

The researchers from the criminal and business law show higher concern towards understanding the factors that shape the people’s behaviors within a society. The law researchers attempt to explore the factors that positively or negatively influence the
people from engaging in actions that are rewarding at a personal level, and harmful at the societal level. These behavioral actions may range from robbing the bank to illegally downloading a song from an online website (Tyler, 2006; Tyler & Huo, 2002). Additionally, the court and police force also requires the effective cooperation from the community members for controlling the crimes and overall societal disorder. Unless the society not report the crimes to local police station, it would be highly challenging to minimize the crime rate in that community (Tyler & Huo, 2002). Another example of cooperation is the tax collection process. The government cannot initiate the development projects if society does not cooperate by paying taxes (Braithwaite, 2003; Feld and Frey, 2007). Therefore, the study of law focuses on developing the understanding about motivational factors that could cultivate the sense of collectiveness within the society, discourage the engagement within personally rewarding activities and increase the cooperation with legal authorities.

The authorities holding the public office encourage people to cooperate with them by ensuring an active participation in the personally expensive activities such as fighting at the front-end during wars or paying taxes (Levi, 1988; 1997). Moreover, while living in a civilized, democratic society, the society members are obliged to cast their votes and maintain the societal structure by working together and resolving the community issues (Putnam, 2000). Levi and Stoker (2000) mention that these are the reasons, why it is necessary to understand the motivational factors that foster the cooperation within exiting socio-political environment. The public policy is among the most important aspects of good governance. It related to developing social policies and strategies that could coordinate and align the people’s actions within the community. These efforts tend to
develop a process for creating and executing the policies and policy-related decisions such as deciding whether to join the war or where to locate the nuclear plant. While making the high-stake decisions, it is highly important to get the buy-in of the whole society. The acceptance and mutual cooperation are vital as wide-spread adherence to the new rules is not possible if the majority is not willing to cooperate with the government and policy makers (Grimes, 2006).

Taking a broader perspective, the governance and regulation involve serious matters of concern, such as interstate political relationships, compliance with the new rules and regulations and international relation issues (Simmons, 1998). Hurd (1999) mentions that the researchers within the international relations field have always attempted to explore the factors that motivate states to accept and comply with the international, rules, norms and commitments. The issue has gained more importance since the relationship between non-governmental, governmental, multinational organizations and states has become more complex (Reus-Smit, 1999). The good governance depends on the policy makers’ ability to gain the wider acceptance and motivate the mass public to follow the laws and accept the agreements with renewed terms and conditions. The last few decades have observed that the intensity associated with these issues has increased significantly. The issue of terrorism has created a situation of urgency. The underlying situation has clearly shown how the lack of cooperation across the border can impose the threat to the institutions, institutional actors and whole states.
2.1.2 Social Motivation and Institutions Interactions

The underlying study aims to assess the robustness and range of one motivation type, that is, a social motivation in underlying context. The systematic exploration of the two social motivation aspects (dispositions - identity, values and attitude, and organizational policies- motive-based trust, procedural justice) would broaden the understanding of the underlying phenomenon. The significance of these motivations relates to the instrumental motivations that involve the use of sanctions and incentives. Individuals are inspired by a wide range of objectives to ensure the cooperation and sole material self-interest provides an inadequate explanation. Among different motivational areas, the social motivation consistently explains the variances that other instrumental factors cannot explain (Tyler, 2010).

The motivational framework could be broadened to better understand the factors influencing the mutual cooperation. The literature review further suggests that the value of social motivational factors has been under-explored. It suggests that the cooperative behavior, and particularly the voluntary co-operation is well-described by the social, motivational factors than the instrumental variables like sanctions and incentives. When the intensity of the impact of social motivations and instrumental variables is compared, the social motivations outweigh the instrumental variables while explaining the variation. The discussion suggests that researchers interested in understanding the co-operational behavior should focus upon social rather than the traditional instrumental motivations. The impact of social motivation on the individuals’ voluntary co-operation is particularly strong (Tyler & Blader, 2003). As the organizations mainly emphasize upon increasing
the motivation, they must study how the individuals could be motivated to adopt the desired behavior within an organization, work groups and the overall community.

The underlying study also intends to assess the possible range of which the social motivational factors are significant. Although it would be highly challenging to test the developed model within all settings, the underlying phenomenon be observed within three settings, that is community, industry and political participation. Elaborating more clearly, the first work setting is the management of different organizations. The researchers conduct the interviews at their respective workplaces and their perceptions be related to the workplace co-operation. The second research setting within which the identified model be tested includes the community. The researcher analyzes the people’s perceptions towards the cooperative behavior within the community. The interviews of large metropolitan community residents be conducted and their perceptions about the regulation execution and consequent to collaborate with the institutions and other legal authorities be assessed (Tseng & Seidman, 2007). Within the third research setting, the researcher examine the political involvement and cooperation. It involves various governance participation studies within Asian communities. The comparison of three research settings broadens the understanding of social motivation dynamics.

2.1.3 Psychological Model of Cooperation

Lastly, the study intends to assess the psychological model of cooperation. This model contends that dispositions (such as identity, values and attitudes) are influenced by the organizational practices and policies (co-operation between academia and industry, procedural justice and motive-based trust). This influence ultimately shapes the attitude towards co-operation. The model offers an organized framework for comprehending how
social motivations share a dynamic connection with each other (Tyler & Blader, 2003). Moreover, it provides the guideline regarding how to use the authority within communities, organizations and groups (Fisher, 2016). The model recommends the policy makers and authority holders to act in a way that encourages comprehensive assessment. Motive-based trust along with the procedural justice leads towards favorable disposition and ultimately the voluntary cooperation.

2.1.4 Beyond Material Self-interest

The motivation is a broad term and has been distinguished into different types by psychologists, including the goals and objectives that energize the behavior, assessments regarding the world nature used to develop plans and select the action timing and manner (Van Lange et al., 2007). The issues of judgment and cognition involve a choice that individuals make regarding, how the developmental goals could be attained in the most effective manner. Motivation relates to the people’s desires to achieve the pre-set goals. It is difficult to understand the intentions unless the authority holders know the goal people are seeking to achieve. It is possible that people may fail to accomplish the goals due to any mistake. However, the purpose has always guided the actions. The instrumental analysis of the action differentiates between the motivation and cognition. Within the instrumental model, the people derive the energy from the goal and urge to fully exploit the rewards, while minimizing the costs. For instance, the experienced punishments.

While doing this, the individuals tend to forecast the losses and gains associated with different actions. The assessments regarding the world’s nature to extend, which individuals engage themselves within wide ranging behaviors while pursuing their goal of punishment minimization and reward maximization (Karremans & Van Lange, 2003).
Within the study areas of public policy, political science, management and law, the human motivations have been most extensively discussed within the economics and psychology. The latest research within the both fields reflects the same assumption that individuals seek to fully exploit the personal utilities. These personal utilities have been explained as the material terms. It is argued that although individuals derive the motivation from this desire, however, they make their calculations simpler by using heuristics while maximizing the benefits from personal utilities (Kruglanski & Higgins, 2013). Moreover, certain limitations such as possible biasness, chances of errors and information processing limitations influence the people’s ability to derive the motivation from utility maximization. Stating differently, individuals attempt to measure their self-interests in an optimal manner. However, many people do not have the ability to do it perfectly, still, they attempt to maximize the self-interest considering all possible limitations such as information processing, time and cognitive abilities.

2.1.4 Connection of Psychology and Economics

The last few decades have observed major advancements in the relationship between psychology and economics. Economists are attempting to extend the research and broaden the insights of the psychologists. Various empirical studies have been conducted within the arena of behavioral economics. The underlying research study expands the connection between both fields (economics and psychology) by exploring the wide range of motivations within the social settings. During the recent years, the modern economists have shown high interest towards exploring the decision making and
judgment areas within the arena of psychology. This commonly investigated area by economists and psychologists emphasizes on the biases and cognitive errors that reform the specific findings of individuals looking for to follow their interests during the decision making process (Hastie & Dawes, 2001; Brocas & Carrillo, 2003).

The review of decision-making and judgment literature lacks the adequate focus on the motivation. Mainly, the researchers have explored the cognition. There is need to comprehend how individuals capitalize their subjective knowledge about the world while making decisions. It is assumed that the core motivation for taking such actions is an urge to exploit the material benefits and lessen the chances of bearing any material loss. But social psychologists must understand that the motivation and cognition, both are vital for understanding behavior towards cooperation. The individuals’ behavior towards the cooperation is complex, and difficult to understand (Higgins & Kruglanski, 2001). Hence, the in-depth comprehension of the decision-making can benefit from the extended examination of the motivation for action.

With regards to the motivation, the economists assume that individuals seek the motivation to optimize the personalized self-interests. The term “self-interest” is explained as the material loss and gain. Undoubtedly, many economists and psychologists have recognized that individuals seek the motivation from a broad range of material gains. However, these material losses and gains have been under-explored by the past studies. This research study doesn’t primarily focus on the other motivating factors for fostering the cooperation. The researchers also highlight that the previous models and frameworks of human motivation within the fields of public policy, political science, management and law provide the inadequate explanation of cooperation and don’t take
the holistic view of underlying phenomenon, but limit their focus to analyzing the role played by sanctions and incentives (Green & Shapiro, 1994; Pfeffer, 1994).

The experimental literature within the field of economics recognizes the importance of social motivation, however, the experimental researchers mainly employ the research methodologies that make it challenging to compare the magnitude of influence on instrumental motivation. Contrary to this, the underlying study intends to employ the survey technique. This research method would result in more clear and explicit comparison of relative impact within the natural settings. It offers an approximation of the variation magnitude in cooperation within the real-world settings. This comparison emphasizes the significance of social motivation.

Recently, the researchers are showing high interest towards empirically examining the firms’ internal dynamics and one good example of this growing interest is a relational contract model (Baker, Gibbons & Murphy, 2002). This model argues that it is important to go ahead of understanding formal organizational structures and recognize that without relational contracts, the recognized rules and strategies are lacking and invalid. These rules must be supplemented by the adequate comprehending of causal base activities relational contracts that motivate the individuals to use their information within a particular setting and adapt themselves to unique contingencies.

The management aims to develop an organizational design that could get the larger buy-in at the workplace. The structure must motivate the employees to ensure the cooperation and compliance with the rules and regulations. The formation of relational contracts serves best the purpose. They bound the employees to ensure high performance and work for the shared objective. However, the researchers seek to explore how these
relational contracts could be implemented by designing the groups, ensuring the compliance, and creating the circumstances within which these contracts would be honored. Stating differ, the underlying research focus on the social motivations, where, the researcher attempt to understand the interpersonal processes within organizations and different groups (for example, also explored by Gächter & Fehr, 1999).

The recent experimental economists also emphasize the importance of understanding people behavior within different social settings. Recently, a substantial effort was made by the researchers by conducting 15th society study of co-operative conduct. The research attempted to identify the motivational factors that shape the co-operation. The results suggested that individuals within a social setting have unique social preferences other than seeking the material benefits. The author commented that:

“Subjects care about fairness and reciprocity, are willing to change the distribution of material outcomes among others at a personal cost to themselves, and reward those who act in a pro-social manner while punishing those who do not, even when these actions are costly” (Henrich et al., 2004).

The above research had a broad research objective and attempted to understand the social motivation within different cultural settings. This research study is a continuation of similar studies within the field of cooperation and social motivation. Out of 15 studies, the results proposed that there was wide variation in the people’s behavior and self-interest model offered the narrow explanation. Each study proposed the evidence for social motivation. Later, Camerer and Fehr (2004) commented on these 15 studies and explained these social and co-operative motivations as the social utilities. The researchers further mentioned that within different societies, the behavior differs with the
social, political and economic characteristics (also reported by Gintis et al., 2005). Other experimental studies also support the arguments that individuals agree to pay the personal costs for enforcing the fair rules and regulations (Gürerk, Irlenbusch, & Rockenbach, 2006).

Overall, the above discussion suggests that behavioral economics researchers have mainly focused to comprehend how individuals feel about the underlying societal or market situations. The previous studies have consistently proposed that fairness based judgment is mostly used within a market environment. One common approach in this regard is to adjust the behavior so that it could reflect the justice norms (Kahneman, Knetsch, & Thaler, 1986). It is argued that when moral values and principles are violated, the individuals disagree to involve within market transactions (Tetlock & Fiske, 1997; Baron & Spranca, 1997). Lastly, individuals, considers the procedural justice issues while considering the markets’ suitability as allocation mechanism (Frey, Benz, & Stutzer, 2004; Sondak & Tyler, 2007) or during the negotiation (Hollander-Blumoff and Tyler, 2008).

2.1.5 The Myth of Self-interest

The social motivation and cooperation have wide implications for modern organizations and one of the major reasons behind it is that individuals commonly overestimate the material gain and loss and self-interest centrality. An interesting research was conducted by the Miller, where, the researcher contended that the individuals’ perceptions of their self-motivations and motivations of others are skewed towards the self-interest greater than the reality (Miller 1999; Ratner & Miller, 2001). The philosophies about the human motivational needs from the institutional designs. The past
motivation theories and models propose useful ideas regardless of associated empirical validity (Ferraro, Pfeffer & Sutton, 2005). The underlying study intends to focus on the two cooperation types, performance (with regards to the resource creation and overall group productivity) and adhere to the rules (compliance with the rules and policies of the organization).

It is interesting to note that the individuals response vary in their perceptions of how much energy they apply on the behalf of communities, organizations and groups to which they share a close association. Within these groups, organizations and communities, examples of highly motivated individuals are available that always show the readiness to help others on a volunteer basis and take the responsibility of others for fulfilling others’ needs and accomplishment of the shared objective (Strand & Freeman, 2015). The opposite examples are also available where the individuals lack the willingness to exert extra efforts helping others and only prefer to fulfil the designated duties. These people show a passive involvement within the group. Then there is another category that does not even fulfil the basic responsibilities and tends to shirk the assigned roles to the maximum possible extent. The underlying study attempt, explored the predictors of these group behaviors, the reasons behind this wide variation, which factors motivate or discourage the people from ensuring cooperation within the group, organization or community. These are social and instrumental motivations.

Despite extensive exploration, understanding the motivation is still a matter of concern for modern researchers. One reason behind the concern is that individuals have the freedom to decide the nature and degree of their cooperation efforts within underlying context. It is up to them, whether they decide to expand their efforts for the
accomplishment of group objectives, or assume a passive role and only exert efforts is required. This behavior towards the group engagement has wide practical implications for the researchers and organizations that seek to maximize the group functioning and viability. Hence, the underlying research intends to comprehend the factors that influence the decision-making process.

Various kinds and forms of motivation have been identified by the psychologists. The underlying research attempts to make this discussion simple by focusing on two most important and basic motivation types that is social and instrumental motivation. The instrumental motivation shares a strong linkage with the association between material and social self-interest. Regardless of their motivation level and source of motivation (no matter if it is a material resource gain or avoidance of a material cost), these conducts are receptive to individuals’ estimation of short-term tangible loss and gain.

2.1.6 Cooperation as a Theoretical Issue

It is generally recognized by the social scientists that different motivational factors influence the individuals’ interaction and cooperation with others. The positive influence is the personal benefits derived from the corporation. Whereas, the negative influence help to maximize the self-interest, the involvement existed within cooperative and social activities. The individuals’ cooperative behavior is formed by the equilibrium of positive and negative influences. Consequently, they tend to engage within the group to a limited extent. It is also termed as the mixed motivation. The social psychologists explore the dynamics areas of limits from dyadic negotiating (Thibaut & Kelley, 1959; Rusbult & Van Lange, 2003) to the community and a group-level social dilemma (Weber, Kopelman & Messick, 2004; Kopelman, Weber & Messick, 2002). The analysis
of these wide-ranging themes, highlights a common theme that is the urge to motivate people to behave in a way that transcends the self-interests and also serves the group interest.

Generally, the social psychologists have focused on the small group settings while understanding the cooperation behavior. More research is required within the social dilemma area for understanding the mix-motive conflicts within different societies and communities (Baden & Noonan, 1998; Ostrom et al., 2002). There is need to discuss how individuals act in situations where the urge to maximize the self-interest has a direct negative influence on the group welfare in the long-run. Two basic characteristics of the underlying social dilemma have been identified and discussed by Weber, Kopelman, & Messick (2004). The authors comment that:

“(a) at any given decision point, individuals receive higher payoffs for making selfish choices than they do for making cooperative choices, regardless of the choices made by those with whom they interact, and (b) everyone involved receives lower payoffs if everyone makes selfish choices than if everyone makes cooperative choices”


Within the above discussion on the social dilemma situation, the individual’s cooperative behavior derives the direct influence of characteristics, interests and types of societies, organizations or groups. As mentioned earlier, the core focus of the underlying study is the cooperation. Hence, it is highly important to firstly clarifying the meaning of co-operation. The literature review suggests that this term has been differently defined and explained within different areas of psychological research. The underlying research defines the cooperation as the decision of an individual regarding the extent to which
she/he involve within the community, organization or group by engaging in activities that are important for the success of the whole group, organization or community. These activities can have a short-term or long-term influence on the collective betterment and may not necessarily share a linkage with short-term costs or benefits. Hence, the notion of co-operation in underlying context is derived from the social dilemma literature. The studies mention that people’s immediate selfish or personal interests and activities contradict the actions taken for collective welfare (Komorita & Parks, 1994). In the short-run, the individuals are inclined towards the personal benefit. Whereas, in the long-run, the people show interest towards the collective welfare. Stating differently, Smithson and Foddy (1999) have defined the social dilemma as follows:

“social dilemmas can be defined as situations in which the reward or payoff to each individual for a selfish choice is higher than that for a cooperative one, regardless of what other people do; yet all individuals in the group receive a lower payoff if all defect than if all cooperate” By Smithson & Foddy, 1999.

On one side, if individuals don’t consider the group welfare, the inclination towards the fulfillment of personal objectives cause the whole group, organization or community to fail in the long run, causing a big mutual loss. On another side, it is not necessary that the active engagement in the collective welfare protects the personal interests as well. Contending on the same note, Jonathan Baron has commented that:

“Each person benefits by consuming the fruits of others’ labor and laboring himself as little as possible—but if everyone behaved this way, there would be no fruits to enjoy” By Jonathan & Baron, 2000.
To ensure the cooperative behavior, many modern organizations have linked the teamwork and cooperation with the long-term incentives. Within organizational settings, the membership benefits rely on preserving the effectiveness and efficiency of the whole group. This setting motivates the individuals to cooperate within the work group. The social dilemma suggests that many individuals wrongly perceive that other group members pursue the collective welfare and they are free to achieve their personal objectives (Tyler & Blader, 2001). The effective group management requires each individual to set aside the personal agenda and ensure active cooperation for maximizing the collective benefit. It is also termed as the public good dilemma as individuals are attracted to leave the collective work of other group members and free own-self from collective obligation. Such “free-riders” decrease the success chances of a group, organization or community (Bergmüller, Johnstone, Russell & Bshary, 2007).

The underlying research is focused on analyzing the degree to which individuals engage in the cooperative activities on behalf of the whole group, and what are the main influencing factors in this regard. To achieve this objective, the researcher interviews the employees from different organizations. The study also takes the opinions of the residents within a community. These residents or employees have an urge to gain the group membership benefit and intend to remain the part of the group as long as the group is viable and effective (Tyler & Blader, 2013). On another side, it is difficult to realize the immediate benefit for exerting extra efforts for making the group successful. It takes time to get a fair return of complying with the group rules and policies. Individuals’ self-interest mostly contrasts the group interest. Employees steal the office supplies when they
get less for the exerted efforts. In a similar manner, community residents compare the risk associated with reporting the crime against assessing the legal authorities.

2.1.7 What Types of Cooperation Influence Group Success?

The group viability depends on the two co-operation types, performance and adherence to rules. The co-operation aspect that is evaluated in different experimental games relates to the situation, where individuals limit their activities to maximize the self-interest for ensuring complete compliance with the group rules (Tyler & Blader, 2000). One example of this type of cooperation is fishing within specified limits. Another example is the fair bargaining where people attempt to maximize their self-interest within the limits. Many people dream to become rich overnight want to steal money from the bank, but avoiding doing it, as it is against the law. Overall, these examples indicate the situations, where people refrain from getting involved in activities that maximize their self-interest but are not allowed within the existing legal framework.

This aspect of co-operation involves refraining from getting engaged in undesirable behavior that does not comply the regulations. It is termed as rules adherence- or rules following within the group to regulate the resource usage. Other than the rule adherence, the co-operation has another aspect that is performance. In the first case, individuals cooperate with each other to ensure the rule adherence. In the second case, the people cooperate with each other to maximize the performance of group, organization or overall society. This co-operation motivates the individuals to perform on behalf of others for collective interest (Tyler & Blader, 2000). Individuals are also motivated to ensure active engagement within activities that could resolve the group issues. Within work institutions, these activities include performance issues. At the
community level, these tasks include resolving the community problems and helping the larger community to address key concerns. Another broader example of this aspect is government’s reliance on people to ensure active participation within the political process.

Summarizing the whole discussion, the two different aspects of co-operation differently motivate the individuals within a group, organization or community to attain the collective goals. The difference between both cooperative conducts explain how some individuals tend to maximize the performance by actively resolving the group issues and working on behalf of the group for larger interest, and some people refrain from getting involved in activities that don’t comply with the prevailing legislative framework and could potentially harm the group interest (Rowley, & Moldoveanu, 2003).

2.1.8 Cooperation for reason and knowledge

The underlying research intends to distinguish both co-operation aspects, voluntary and required cooperation. Taking the example of workplace performance, the workforce is required to ensure active engagement in activities that are clearly communicated within their job description. This is the expected co-operation, and as it also termed as the “in-role” conduct. For instance, the employees are expected to arrive at the office at 9:00 am and leave at 5:00 pm. It is the required co-operation that must be ensured to remain the part of that group. Now, there are many instances, where co-operation is not required, but voluntary. For example, helping other group members in achieving their goals, putting extra efforts during the peak hours, proposing innovative ideas to enhance the organization’s effectiveness. These are also termed as the “extra-role
conduct”. It is not an essential job aspect and is voluntary by nature (Fritsch, & Franke, 2004).

The adhere to the organizational rules and policies is considered the appropriate behavior at the workplace. It is important to observe whether the employees are willingly or unwillingly complying with the rules. When employees follow the rules, even when they are not under observation, this attitude finally leads towards the voluntary cooperation (Van-Dijke, Cremer, Brebels, & Van-Quaquebeke, 2015). When employees seek the motivation from incentives, they require explicit communication of the desired behaviors and direct linkage between the rewards and desired behaviors. For instance, the organization must create a linkage between high attendance and timely arrival and departure with some monetary or non-monetary reward after a certain period. The same holds true for the sanctions. However, developing the effective sanctions strategy is more complex than the reward strategies as people tend to hide the undesired behaviors. The management must develop an effective surveillance system to identify the rule-breaking. In both situations, employees lack the motivation to co-operate with each other if clear linkage between desired behaviors and sanctions/rewards is not communicated (De Jong & Kemp, 2003). In some cases, employees ensure the cooperation in the absence of such linkage. However, to ensure the wider co-operation, it is important to link their self-interest with the collective welfare.

Within a multigenerational workplace, it is highly challenging to create such linkage that can satisfy the diversified motivational needs of individual employees. The management’s ability to successfully create this linkage depends on the underlying economic situation and business life cycle. During economic downturn or recession,
developing this linkage for ensuring wider cooperation is a highly challenging task. The collective benefit is maximized when employees ensure cooperation for non-instrumental reasons. It is also termed as the voluntary cooperation as the individuals are not instrumentally but socially motivated. The sanctions further clarify the worth of voluntary cooperation. However, sanction based cooperation strategies more expensive than the reward strategies as they involve introduction, development and perseverance of effective sanction strategies avoid any negative influence. For instance, it is easy to communicate that involvement within the undesired behaviors such as theft, destructing office equipment, unauthorized use of office supplies is punishable. However, it becomes challenging when the management tends to deploy the adequate resources for developing the linkage between undesired conduct and the possibility of getting identified and punished.

Tyler & Steven Blader (2000) differentiates two cooperation behavioral aspects, mandated behavior and discretionary behavior. Mandated or required co-operation refers the situation when individuals adopt the behavior that is made necessary by other group members. The guidelines and rules dictating this conduct are developed collectively. Contrary to this, discretionary co-operational behavior or voluntary behavior is not mandatory or dictated by the collective group, neither is it required by the group regulations and shares no direct relationship with the sanctions or rewards. Hence, the difference between both behavioral aspects involves the intention and behavioral nature. The authors further mention that the required or mandated behavior originates from the group regulations (external sources), whereas, the voluntary or discretionary conduct originates within the individual. These individuals are intrinsically motivated to work for
collective welfare. For instance, such intrinsically motivated individuals execute the duties on behalf of others to maximize the group performance. These activities are out of the scope of their respective job descriptions. When employees fulfil the duties within their job description, it is termed as the mandated cooperation. But when some pick the garbage to clean up the floor, when it is not his/her duty, it is termed as the voluntary cooperation.

Interestingly, both cooperative aspects share some interconnection. When an individual is required to engage in mandatory cooperation, it must be observed to what extent the individual has complied with the group requirement. As mentioned before, usually individuals are free to choose the way, how they fulfil the behavioral requirements. This freedom involves the latitude within the energy that individuals exert while fulfilling the mandatory or required group tasks (Fritsch, & Franke, 2004). For example, employees can fulfil the duties within the scope of their job description without paying much focus on different quality aspects. On the other hand, some employees, although fulfil only basic job requirements, but they make sure to consider all quality aspects and complete their task by ensuring high quality performance. Hence, the cooperation within the mandatory behavior also varies from one individual to another.

As individuals are free to perform these mandatory tasks in whatever way they want, they concern to maximize the performance differentiates the more cooperative employees from less cooperative ones. Individuals cooperate within the group or organizations when they get engaged in mandatory behaviors and particularly when they fulfil the mandatory tasks with enthusiasm and energy instead of competing it just for the sake of completion. It is argued that assessing the extent to which the employees show
interest in completing their mandatory job requirements is important in case of low-level jobs (Newman & Harrison, 2008). Today, the complex job nature largely depends on the employees’ motivation for successful completion of the mandatory tasks within existing rules and regulations. It is challenging for modern management to ensure the effective supervision of all employees and assess the mandatory cooperation of individual employees across all performance aspects. It requires huge investment for developing large scale monitoring and surveillance system for saving the time and human effort. Hence, management should satisfy the motivational needs of employees to lessen the necessity of supervision (Zhan, Tang, & Zhang, 2013).

The research conducted by Katherine Newman broadens the understanding in this regard. The researcher has discussed the employee motivation and co-operational behavior in the context of the restaurant industry. Within this research setting that is characterized as monotonous job nature and high safety rules and regulations, the researcher proposes that willingness to help others is regarded as the highly desired characteristic. The same holds true at the community level as well. Community cooperation is highly important for resolving the community issues like managing social order. It is important to understand the difference between required and voluntary behavior in strongly motivating the community members. Individuals involved in the required behavior would seek motivation from concerns and instrumental judgments (Budhathoki, & Haythornthwaite, 2013). Whereas, individuals are motivated to adopt the voluntary behavior through internal values and attitude towards the community. Stating differently, voluntary behavior derives the influence by sensing what is the appropriate and right thing to do. Justification of proposing that required cooperation is
instrumentally fostered is that punishments and incentives share linkage to the extent to which individuals involve within conducts that are declared mandatory by the group. For instance, the organizations base the salaries of their employees on their job performance. For effective performance evaluation, the group supervisors monitor the performance and assess the energy with which the employees perform their work duties. The group determines the extent to which an individual has fulfilled the expectations. These group's expectations ultimately lead towards determining the reward allocation. Contrary to this, supervisors or group do not specify the voluntary behaviors for employees or individuals. Hence, they do not share a direct link with the rewards or sanctions.

The voluntary behavior is linked to the internal motivation and feelings. It largely depends on the individual employees’ values and perceptions. When individuals are intrinsically motivated, they do not require any direct reward for their voluntary efforts (Bladder, & Tyler, 2009). Such internal motivation is fostered by the beliefs, values, attitudes and feelings about the group’s legitimacy and commitment. These values and attitudes offer the individual personal justifications for demonstrating the cooperative behavior. However, it would be wrong to comment that the material or tangible self-interest of the individuals derives no influence from the cooperation. There might be some linkage with their self-interests as well. However, individuals don’t decide to cooperate voluntarily while seeking a direct association with their self-interests. The above discussion suggests that four forms of cooperative behavior exist within group, organization or community (Ho & Peng, 2016). Compliance with the prevailing regulations differs from the reverence by expectations that individuals deferring to the regulations do even when external sanctions do not exist. In a similar manner,
discretionary or extra role conducts are endorsed without expecting any external incentive. Intrinsically motivated individuals engage in extra-role behavior, even when they do not expect the others appreciate or recognize their efforts.

2.2 The Interface of University and Industry

The underlying study applies the above discussion in the context of cooperation between industry and university. When academia and industry work in a cycle to build the knowledge base, their cooperation becomes the powerful engine for economic development and innovation (Siegel et al., 2003). One excellent example of this cooperation is the Silicon Valley. Last five decades have observed an increased collaboration between the knowledge centers resulting into the transformation of different industries, technological advancements at a breakneck pace and modernization of higher education system. Today, the top-notch higher education institutions are increasingly interested in developing close collaboration with the industry. The university-industry nexus has started resulting in material gains for both sides. On the academic side, the obvious benefits are a steady stream of external funding, increased career-development opportunities for students and professors, enhanced research quality, up gradation of the existing pedagogy according to changing environmental needs. Even the institutions with advanced research facilities are collaborating with industry for enhancing academic output. Cai (2013) comments that many European higher education institutions must develop the partnerships with the industry as currently, the collaboration is experiencing slow pace within the European region. There are many examples where European universities made a failed attempt to collaborate with industry due to poor co-ordination and communication.
There is need to explore how the coordination and cooperation between industry and university could be fostered in a way that failure risk could be minimized, and how the industry and university can successfully resolve the issues involved within cooperation. The underlying research address these questions based on in-depth theoretical and empirical research. The results to be based on the experiences and perceptions of senior university officials and industry professionals that are currently involved in building the successful university industry (UI) partnership (Bstieler, Hemmert, & Barczak, 2015). The research highlights that the highly successful collaboration is the long-term partnership that could fulfil the interests of both sides. Santoro (2000) mentions that such successful and long-term partnerships are based on the shared vision, are interconnected with deep professional ties, and thrive within the environment of trust, where both sides actively seek to bridge the cultural gap between industry and academia. Contending on the same note, Alan Begg, who is currently the Senior Vice President at Group Technology Development, SKF Group comments that:

“It is individuals who understand both worlds – academia and business – that are the driving force behind successful partnerships”- Alan Begg, Senior Vice President at Group Technology Development

Usually, the strategic UI partnerships offer the tangible benefits to both sides after five to ten years. Hence, it is a long-term collaboration and largely depends on persistence and willingness to ensure active cooperation. Perkmann & Walsh (2007) comment that such long-term alliances require the up gradation of the human capital for making the collaboration work for both sides. The mutual trust and confidence count the most in such partnerships. In the course of time, a cooperative and well-managed
collaboration results in high quality academic output in the form of well-prepared professors and graduates with a broadened understanding of the cultural divide. They can relate the research interests of organizations and co-operatively work for the accomplishment of the shared goal. An example of collaborative university industry partnership is the IBM’s new Nano-technology center that is having a worth of $90 million and is located in Zurich. It is the result of a 10-year partnership with Swiss federal institute of technology and aims at advancing information and energy technologies (Plewa, Korff, Baaken, Johnson, Macpherson & Rampersad, 2013). The major success reason is the active communication and cooperative attitude from both sides. The strategic relationships between both sides are deep and investment expenditure has been incurred over the span of a decade. Such environment can enhance the overall European’s innovation climate (Motohashi, 2008).

The European higher education’s modernization agenda makes it a priority to enhance the collaboration between HEIs (Higher Education Institutions) and business sector. Horizon (2020) report comments that the future of the European Union’s educational programs and research and innovation assure that such collaboration is strengthened and exploited to its fullest. Various initiatives have been launched by the EU commission to strengthen the cooperation and build strong ties across the knowledge triangle, including the University-Industry Forum, European Institute for Innovation and Technology and Knowledge Alliance's pilot project. However, it is noted that a great cultural divide exists between the industry and academia. Technopolis executed a study on European University Business Cooperation in 2011 and reported that the great cultural
divide is one of the greatest challenges in developing a successful partnership (Plewa et al., 2013).

The analysts further reveal that this cultural divide challenge could be minimized, however, it depends on various factors including efficient academia leadership, faculty with up-to-date industry knowledge and structures and rewards for bridging the gap (Bstieler, Hemmert & Barczak, 2017). European higher education institutions can substantially enhance the attractiveness to the corporate world by ensuring that collaboration with the industry is their top priority. They can also develop a pool of academic professionals with extensive industry experience (Motohashi, 2008). Science Business Innovation Board that is a non-profit scientific association commissioned the underlying report for improving the innovation environment within the European region.

2.2.1 Partnerships Impact Teaching and Learning

The main focus of all industry-university associations combine the research, although many have an effect on learning and teaching that builds up logically out of the collaboration. University professors join a scheme within the business corporation and researchers are in agreement to deliver lectures, generating a productive ongoing swap or exchange that assists the up to date curriculum (Laursen, Reichstein & Salter, 2011). However, a rising proficiency gap and brutal competition for universal talent have provoked a number of innovative firms to build up collaborations with academia (universities) particularly intended at modernizing learning and teaching. The collaboration itself turn out to be a revolutionary trial in budding novel talents for a next-generation personnel/workforce and a channelized for upcoming recruitment of apex talent.
One more revolutionary move toward collaboration that set up a diverse disciplinary research organization in which academics and researches of industry follow clarifications to multifaceted, systems-level troubles that have need of diverse-disciplinary proficiencies. The construction of prestigious diverse-disciplinary organizations can assist fail conventional educational silos by producing encouragements for fresh areas of investigations in different fields, introducing new and revise courses and diverse-disciplinary degree courses, whereas it also driving improvements for example BP’s Energy Biosciences Institute at University of California and Calit (Lee, 2000). These and further cases emphasize the growing function, industry can engage in recreation to modernize core curricula, progress the knowledge-based and expertise of upcoming graduates and promote economic competitiveness.

The instructions learnt are in human capital collaborations has a superior cost Perform them, as a final choice when you can’t achieve the objective single-handedly (Minshal, Montara, & Ulrichsen, 2016). “If Microsoft had chosen to do this work alone, it would have had minimal impact. There was tremendous value in the partnership,” declares Microsoft’s Butler, construct collaboration with a group of some key principles; the standard rule is to be aware of each other “understanding”. Payout time on the plan or agenda of everyone in the party, make sure justice in the joined groups; in a few cases somewhere the objectives is wide and societal in nature, achievement may depend on reducing claims to intellectual property (Abramo et al., 2013).

2.3 Conceptual Models of Industry and university Linkage

Goldstein (2010) and Uyarra (2010) have shown that over the past some year’s diverse moves have been developed to clarify the function of Higher Education Institutes
(HEIs) in local industrial advancement. The subsequent division classifies and contrasts four conceptual models that build highly in modern debate on how HEIs can advantage their industrialized areas.

2.3.1 Entrepreneurial university model

The entrepreneurial university concept (Clark, 1998; Etzkowitz, 1983; Etzkowitz et al., 2000) argues that HEIs (Higher Education Intuitions) are progressively more harmonizing their conventional mission teaching and research by a third one, it means that more development economically. Institutions of higher education are seen to contribute to regional development by taking a vigorous position in commercializing their awareness and knowledge through licensing and development of patents, (Grimaldi et al., 2011). Such actions are thoroughly connected with the execution of novel motivation and reward mechanisms for commercialization for academia’s scientists, an industry culture inside academic world, and the formation or improvement of interface roles for instance technology relocate offices (Goldstein, 2010; Siegel et al., 2007).

A number of studies have connected the entrepreneurial function of HEIs (Higher Education Intuitions) with the development of industries in various regions (Audretsch & Feldman, 1996). Various regional industries obtain an advantage in the form of profit from the entrepreneurial actions of HEIs (Higher Education Intuitions) all the way through creation of jobs, spillovers, and follow-ups, in the form of official and casual knowledge and information sharing. The HEIs (Higher Education Intuitions) may in addition come out as ‘anchors’ for regional industry by create a center of attention on new talent, provided research that might be transformed into products and services, as well as sustaining industrialized areas particularly in science-based industries (Feldman,
Institutions of higher education entrepreneurial actions are measured being caused by nationwide strategy aspects, like financial support and IPRs (Agrawal, 2001).

In a number of countries commercialization is open in nationwide and local course of actions. For instance, in the UK “third-stream funding” is a main marker of HEIs (Higher Education Intuitions) performance and has an impact on the intensity of prospect government financial support (PACEC, 2009). In the US, studies have established a raise in HEIs’ licensing and patenting actions subsequent to changes in IPR are happening with the Bayh-Dole Act of 1980 (Henderson et al., 1998). The entrepreneurial university model is not recognized. Initially, HEIs displays much variety inside, in their respective regions and nations from each other.

The multiplicity of categories of universities is inadequately documented by scholars and guideline makers (Johnston et al., 2012). Particularly, the idea of the worldwide university ‘isomorphic development path’ in the direction of entrepreneurial actions (Etzkowitz et al., 2000) has been disapproved of ignoring circumstances specificities and need of direct applicability to different European countries with a belief of the Humboldtian university model (Philpott et al., 2011). According to Lowton Smith & Baghi-Sen (2012) commercialization actions appear to be chiefly common in universities on research-intensive that have worldwide association and a well-built local existence. Furthermore, there is no regular communication connecting the requirements of the regional economy and HEIs’ (Higher Education Intuitions) commercialization hard works.

Entrepreneurial universities do not essentially have a well-built regional effect (Martinelli et al., 2008). Casper (2013) has exposed that universities’ achievement to
scientific commercialization does not only rely on aspects inside of institutions of higher education as well as on the local or regional level (more accurately, on the arrangement of local societal networks). Further research work recommended that the co-presence of particular segments like the computing or the biotechnology (Feldman, 2003; Lawton Smith & Bagchi-Sen, 2012), firm research and development concentration and absorptive competence, impacts of HEIs’ talents to commercialize their investigation and research work (Agrawal & Cockburn, 2003).

2.3.2 Regional Innovation System (RIS) Model

The model of entrepreneurial university, the RIS mechanical stresses on exchange of knowledge between the industrial world and the HEIs. On the other hand, as compared to the entrepreneurial university model, the concept of RIS does not only emphasize on commercialization of activities, although considers a to a great extent set of knowledge transmit mechanisms. These comprise a research contract, recognized research and development institutions and structures of knowledge transformation that do not engage economic rewards for HEIs like knowledge spillovers (for instance all the way through the terms of alumnae to the home labor marketplace) and informal connections with firms. The Empirical work proposed that these knowledge transition mechanisms are more frequent than those connected with commercialization for example, licenses and patents (Perkmann et al., 2013 & Kitson et al., 2009). Inside the RIS(Regional Innovation System) structure, a significant job of institutions of higher education is seen as conveying knowledge to the clusters situated in the region and small and medium enterprises (Uyarra, 2010). HEIs (Higher Education Institutions) are considered to put
such actions in the spirit of their policy and convert into RIS universities or what Kitson et al. (2009) call “the connected university”.

The regional innovation systems (RIS) mechanism (Cooke, 1992; Cooke et al., 2004) conceptualizes institutions of higher education as having an essential position in connecting modernism processes. Institutions of higher education are main players of a regional industries information and knowledge transportation. The RIS idea focused on their connections with a further RIS group of actors and how these connections direct to regional systemic modernization. In accordance with the concept of the RIS, HEIs are significant awareness and knowledge creators that may play connecting roles in the revolution of production variety at the local or regional level.

A main assumption of the RIS framework is that the function of HEIs (Higher Education Institutions) does not simply rely on their own policies, actions and inside organizational distinctiveness. The pattern of the RIS (Regional Innovation system) and the novelty and inclusion ability of other RIS fundamentals are essential for identifying how institution of higher education outputs are transformed into regional expansion. The RIS institutions of higher education model positioned to a high degree of circumstance specificity of university assistance to regional improvement and places of interest that the function of institutions of higher education in regional development might be different, depending on the RIS arrangement (Tödtling & Trippl, 2005), existing knowledge base (Martin & Moodysson, 2011) and the main regional development corridor (Lester, 2005). The RIS framework has been argued for exaggerate local knowledge circulation and underplaying the significance of additional-regional knowledge for the modernization dynamics of areas. The previous work that has taken the worldwide aspect into account
discover hold up for institutions of higher education as attractors of ability of the local financial system and allow organizations to access information and knowledge from international pipelines of global educational research networks with substantial regional influence (Lawton Smith, 2003; Bramwell & Wolfe, 2008). Together the RIS model and entrepreneurial model emphasize universities’ assistance to the economic measurements of regional development and industrial development. An additional complete examination that takes as well non-economic societal actions by institutions of higher education into account is projected by the mode 2 and affianced university models.

2.3.3 Mode 2 University Model

The mainly well-known approach is the “new production of knowledge” (NPK) theory (Gibbons et al., 1994; Nowotny et al., 2001). An abundance work argues that there is an essential transmission of scientific methods that outlines the framework for the variance function of institutions of higher education in particular regional development. A number of challenging moves toward of this analysis have been developed (see the work of Hessels & van Lente, 2008: for a general idea). The NPK theory talk about the function of institutions of higher education relative to fresh types of knowledge production (referred to as mode 2), which are seen to progressively more challenge recognized ones (mode 1).

More specifically, conventional, linear and corrective forms of institutions of higher education research are harmonized by knowledge creation that occurs from connections between diverse disciplines and is openly relevant to present societal challenges (Nowotny et al. 2001; Gibbons et al. 1994) important characteristics supporting mode 2 are information and knowledge production in the perspective of functions and
applicability, heterogeneity, trans disciplinarily, reflexivity, and the latest forms of scientific governance and superiority consideration (Gibbons et al. 1994). Appropriated applicability recommends that HEIs are occupied in joint research with other institutions. Throughout these progressions they construct knowledge that is related and associated to its surroundings. Heterogeneity among factors make wider responsibility, intelligibility and superiority assessments of HEIs actions to viewers away from academic ‘peers’. As a replacement for being isolated from the world, HEIs are revealed as causative to the clarification of common and social troubles (Nowotny et al., 2001).

The Nowotny et al. (2001) show evidence of changes in institutions of higher education and knowledge financial support have been recognized as one of main driver shaping institutions of higher education shifts toward mode 2. Numerous institutions of higher education are facing national financial support limitations and a director of research precedence in the direction of research on social, political, and industrial, importance, for instance issues of the EU (European Union) importance all the way through structured programs, and demands of senior public responsibility, user contribution in the UK (United Kingdom) ‘impact’ of research (RCUK, 2012) and (Shove & Rip, 2000).

Industrial terms of mode 2 behaviors can take more than a few forms, reflecting an extensive involvement of HEIs in regional growth and development and replies to economic and social demands. A number of scholars emphasize participation of HEIs as “co-producers” of understanding of knowledge related to the regional firm background and multifaceted practice-based production of knowledge (Geuna & Muscio, 2009).
Institution of higher education engagement may address new research schemes as well as the clarification of local problems, for example urban transportation, planning, or health.

Hessels and Van Lente (2008) declare that the mode 2 notions have been argued for more than a few reasons, for instance, its conceptual importance and its implication for institutions of higher education policy and research. Likewise, Carayannis and Campbell (2011) challenged the mode 2 move for its ignorance of systems, institutions, natural environment and eco-system. They projected a ‘mode 3’ of production of knowledge to obtain these extents.

2.3.4 Engaged the University Model

Goddard and Chatterto (1999) and ARbo and Benneworth (2007) University engagement is caused by a transfer in guidelines program from a focal point on countrywide challenges and essential research in the direction towards orientation on local framework. An important factor of amendment has been the European policy intensity with its financial support programs (specifically structural funds) animating academia (especially university level) to make stronger their focal point of regional economic advancement and growth in the EU Europe 2020 program and the objectives of ‘smart specialization’ which highlights good organizations and well-built policy potentialities at the local level (see the work of Foray and Goenega, 2013 for details).

According to the Boyer, 1990 the ‘engaged university’ is an idea for indulgencing the adaptation of institutions of higher education functions to regional desires. Engagement of institutions of higher education show a localized development as conflicting to knowledge-generative task (Gunasekara, 2006). Breznitz & Feldman (2012) the engaged academia is professed since focusing its activities to society and industry and keenly
determining regional identity. Academia engagement can obtain a diversity of structures. HEIs may regulate their teaching style or activities to regional requirements all the way through the terms of regionally focused strategy regional student employment and sustaining of alumnae. Engagement is in addition expressed in actions for example formal incorporation of regional requirements in institutions of higher education, organization of regional policy advice the networks (Gunasekara, 2006). Additionally, occupied institutions of higher education may engage themselves openly with regional organizations, given that different research assistance.

The particular distinctiveness of regions and universities are deemed to influence the level and degree to which HEIs (Higher Education Institutions) connect locally. According to Boucher et al. (2003) the characteristics for instance the regional identity, dedication to the region and organizational characteristics of the local or regional economy take a vital part in determining university-region associations. Empirical work recommended that the degree and category of HEIs’ regional engagement are inclined by the age of institutions of higher education and their positions. Younger institutions of higher education and those positioned external metropolitan regions have a propensity to have a more emphasis on regional engagement.

The point of view highly developed by the central characters of the engaged university model have not stay behind unquestioned. One of the most critical issues of this assessment is that the idea lacks observed foundation. But except from a small number of cases, empirical verification of flourishing types of engagement is insufficient. Because of the deficiency of organized confirmation, the central part mechanisms and
impacts that are correlated with a variety of categories of engagement in diverse fields (social, political, and economic) are still inadequately understood (Uyarra, 2010).

In conceptual expressions, the engaged institutions of higher education model not succeed to make clear how HEIs can join together and manage different duties and function in efficient ways. Ultimately, this move towards overestimates the potentials of HEIs realign their behaviors in response to outside signals (Gunasekara, 2006). The engaged university model acquires for approved that HEIs have numerous opportunities for following clearly a regional work. It plays down the reality that in a lot of countries. It is yet nationwide and not regional organized situations (regulation of teaching programs, public funding, and incentive structures) that form the extent of HEIs’ (Higher Education Institution) action.

2.3.5 Comparative Perspective of the University Models

As revealed above, university conceptualizations assistance to regional progress are various area growth. The four institutions of higher education models evaluated in the preceding sections differ in several ways. Emphasizes main divergence concerning the particular activities by which institutions of higher education are seen to give to regional advancement and the implication of policy so as to be drawn. The entrepreneurial model declared that institutions of higher education to encourage the expansion of their areas by attracting in licensing, patenting, and academic development activities. Likewise, The RIS model proposes a wider variety of institutions of higher education activities by adding up “softer” varieties of knowledge move (for instance contract study, research partnerships and formal association with industries of firms) to the direct viable commercialized activities focused by the industrial model. Both the models, on the other
hand, focus merely on the structures of institutions of higher education activities that point out the economic aspect of regional expansion and progress.

Therefore, they reflect economic analysis and technology oriented of universities’ function. This contracted viewpoint overlooks non-economic public actions that HEIs prospectively carry out in addition to teaching and research work. At the same time as not ignoring the contributions made by universities to regional economic growth, the mode 2 and affianced models set out well away from the constricted view, directing notice to cultural, social, and societal actions by institutions of higher education. The major focal point of the mode 2 model is on innovative and fresh types of research actions that deal with huge societal major challenges in areas like health or environment, whereas the engaged model as well comprises other university roles and teaching, directing the attention of institutions of higher education offerings to regional growth that are linked with their societal, civic, and political responsibilities.

2.3.6 Industrial and Regional Development

The four models show the way to various policy conclusions. Policy measures mechanisms in the direction of the encouragement of entrepreneurial behavior cover the directives of community support for the establishment of knowledge transmits associations, science incubators in addition to more direct types of supports of university development processes. Inspiring institutions of higher education to accept the RIS model, needs policy measures that promote the formation of different types of university-industry relations and the amalgamation of academia in regional and modernism policies. Mode 2 actions are most excellent maintained by policy agendas that encourage trans-
disciplinary to do research activities and by society or public financial support of research that believes public challenges.

As a final point, the engaged university model needs a quite wide combination of policies at a different levels or intensities and the proactive collaboration of universities as main players in local or regional modernization and governance set of connections.

2.4 The Knowledge Based Economy and Triple Helix Model

Cooke and Leydesdroff (2006) shows that According to rising industry, technology, and body of intellectuals, policies be supposed to be prepared to take full advantage of performance in “knowledge-based economies” – those economies which are exactly based the process of production, supply and utilization of information and knowledge. This is replicated in the movements in the OECD (Organization of Economic Cooperation Development) economies on the way to development in high-technology industrial sectors, high-technology financing new projects, further highly-trained labor work and connected productivity reward. Even though, knowledge has long been a chief aspect of economic development and growth, economists are at the present discovering ways to integrate additional technology and knowledge in their models and theories. “New growth theory” replicates the effort to recognize the function of technology as well as knowledge in driving output and optimal economic expansion. In this analysis, high investments in development and research, training and education and fresh administrative work arrangements are main (Contractor & Lorange, 2002; Cooke & Leydesdorff, 2006).

2.4.1 The Metaphor of Knowledge Based economy

The evolutionary economists have been initiated a small number of concepts that have been politically more victorious than the symbol of a ‘knowledge-based economy.’
for instance, the European Summit on March 2000 was particularly apprehended “To agree a new strategic goal for the Union in order to strengthen employment, economic reform and social cohesion as part of a knowledge-based economy” (European Commission, 2000). Likewise, in recent times, Barack Obama devised by one of his movements speeches: “[T]his long-term agenda […] will require us first and foremost to train and educate our workforce with the skills necessary to compete in a knowledge-based economy. We’ll also need to place a greater emphasis on areas like science and technology that will define the workforce of the 21st century, and invest in the research and innovation necessary to create the jobs and industries of the future right here in America.”

Can such a great effect on the economy be projected from something as inadequately defined as the information and knowledge base of any economy? How economy can be based with a supply of fresh knowledge that is seriously volatile in nature? In a front mater to a fundamental concern in this particular area, the authors David and Foray (2002) argued that the expression was recently renowned that “as such, it marks a break in the continuity with earlier periods, more a ‘sea-change’ than a sharp discontinuity” (ibid., p. 9). Conversely, these researchers too cautioned for uncertainty since the conversions or revolutions can be examined at numeral diverse levels. They also come to the conclusion that “information and knowledge” ought to more cautiously notable by examine the improvements and enhancement of the economy based on knowledge, in expressions of codification procedures (Cowan and Foray, 1997 and Cowan et al., 2000).
Foray and Lundvall (1996) primary set up the idea of a ‘knowledge-based economy’ at a seminar of the Organization of Economic Cooperation and Development (OECD) in 1994 (OECD, 1996a). In that similar seminar, Abramowitz and David (1996) recommended that codified knowledge ought to be made a vital to the investigation, and devised as follows (at p. 35):

“Perhaps this single most salient characteristic of recent economic growth has been the secularly rising reliance upon codified knowledge as a basis for the organization and conduct of economic activities, including among the latter the purposive extension of the economically relevant knowledge base. While tacit knowledge continues to play critical roles, affecting individual and organizational competencies and the localization of scientific and technological advances, codification has been both the motive force and the favored form taken by the expansion of the knowledge base”.

According to the different authors in the literature Penrose (1999), Machlup (1992), and Cooke (2002) have logically focused on the confide knowledge distinguished the innovative research program as compared to the earlier ideas of ‘Knowledge economy’ with its emphasis on workers’ knowledge and ultimately personified knowledge or awareness. The symbol of a knowledge-based economy encourages the enlarged significance of organized research and development in determining systems of improvement. The knowledge production purpose has turned out to be structural traits of the contemporary economy.

While mainly economists have chiefly paid attention on the impacts of codification on the financial system or economy greater as compared to the procedures of codification as well as societal scientists larger in human based knowledge as compared
to the public management mechanism knowledge. Daniel Bell originated the likelihood of this novel research agenda previously in 1993 which is as follows (at p.20):

“Now, knowledge has of course been necessary in the functioning of any society. What is distinctive about the post-industrial society is the change in the character of knowledge itself. What has become decisive for the organization of decisions and the direction of change is the centrality of theoretical knowledge—the primacy of theory over empiricism and the codification of knowledge into abstract systems of symbols that, as in any axiomatic system, can be used to illustrate many different and varied areas of experience”.

2.4.2 Discussing the Triple Helix Model


The Triple Helix dissertation is that the possible for modernization and economic expansion in a Knowledge based culture lies in a greater well-known role of the institutions of higher education and in the hybridization of essentials from institutions of higher education, industry as well as government to produce innovative organizational and public patterns for the production, transmit and knowledge application. This idea encompasses not just the ingenious destruction that emerges the same as a natural
modernization dynamics (Leydesorff, 2009), although the inspired renewal that occurs inside each of the three organizational areas of industry, university, and government in addition to their connection. Through succeeding progress, an important structure of Triple Helix empirical and theoretical investigation has developed more than two past decades that offer a wide ranging structure for discovering multifaceted improvement dynamics and for notifying regional, countrywide, as well as international improvements and advancement policy creation. This Triple Helix model previously examined literature can be largely observed from two major complementary viewpoints:

A (neo) institutional perspective which inspected the increasing importance of the academia among modernization factors all the way through national and regional case studies (for instance, Luna & Tirtido, 2008; Mello & Rocha, 2004; Viscardi, 2008 & Saenz, 2008) and through relative chronologically past examinations (for example, Furman & Mac-Garvie, 2009; Etzkowitz, 2002). These studies appear at a variety of features of the institutions of higher education ‘third mission’ of commercialization of intellectual investigation and connection in socioeconomic advancement, like stakeholders, forms, benefits, drivers, barriers, impacts, academia technology transport and entrepreneurship part of regional advancement, the policies of government intended to make stronger university-industry relations, etc.

The (neo) organizational point of view differentiates among three major patterns in the positioning of the government institutions, industry and comparative with all: (i) a statist configuration, where government acting as the leading role, driving university and industry, however in addition limiting their capability to begin and develop new transformations (for instance, in
China, Russia, Eastern Europe countries and some Latin American); (b) a *laissez-faire* configuration, exemplified by an imperfect condition involvement in the economy (for instance, the some Western Europe countries and US), with industry as the powerful force along with the other two areas performing as subsidiary support mechanism and having inadequate functions in modernization: institutions of higher education acting primarily as a provider of accomplished human capital, while government chiefly as a supervisory body of economic and social mechanisms; and (iii) a *balanced* configuration, exact to the movement to a societal Knowledge, where institutions of higher education and other knowledge organizations act in collaboration with government and industry and even get the lead in combined projects (Etzkowitz & Leydesdorff, 2000). The unbiased configuration recommends the mainly essential insights for improvements, as the majority favorable atmosphere for innovation are shaped at the connection of these diverse areas.

### ii. A *(neo) evolutionary perspective*, motivated by the social systems theory of communication (Luhmann, 1975; 1984) as well as the mathematical theory of communication (Shannon, 1948) observe the Government, Industry, and University as co-emerging social systems’ sub-set of that work together all the way through an overlay of recursive set of connections and organizations which restructure their organizational planning through spontaneous sub-dynamics (for example, technological improvements). These connections are component of two methods of differentiation and communication: *a well-functioned* one, linking
markets and science and *an institutional* one, linking public and private control at the level of government, industries, and universities which permit a variety of degrees of selective common modification (Leydesdorff & Etzkowitz, 1998, 1996).

Furthermore, according to Leydesdroff & Etzkowitz (1998) *internal discrimination* inside each institutional area creates novel types of structures and relations between the areas, like industrial connection workplaces in strategic alliances among organizations or universities, creating innovative systems integration system.

The organizational areas are in addition observed as *environments’ selection*, and the organizational relationships among them precede like *selection mechanisms*, which may well produce new environmental improvements and make certain, therefore, the ‘regeneration’ of the structure or mechanism (Leydesdorff, 2000; Etzkowitz & Leydesdorff, 2000). The relationship connecting the Triple Helix factors can be considered in expressions of prospective collapse, which, when negative, recommended a self-managing self- motivated that may for the time being be steady in the overlay of interactions among the carrying organizations (for example, Leydesdorff, Dolfsma & Panne, 2006; Leydesdorff, 2003). The communication is in addition captured by defined factors (for example, patent indicators and bibliometrics,) that can offer insights on patterns and trends of private and public collaborations, its geographical implications and concentrations (for

2.4.3 The Concept of Entrepreneurial University

The concept of Entrepreneurial University is an essential impression to the Triple Helix. It gets a pro-active position in placing information and knowledge to employ and in generating fresh and latest knowledge. It functions according to an interactive to a certain extent than a linear model of advancement (Etzkowitz, 2004). As firms move up their technological intensity, they employ in superior intensity of knowledge sharing and training. The government performs as a venture capitalist and public entrepreneur, adding to its conventional regulatory function in setting the regulations of the game. As institutions of advanced education build up associations, they can merge separate part of intellectual property and together utilize them. Advancement has extended from an inside procedure as well as even among organizations to an activity that engages different associations not conventionally consideration of as having a direct responsibilities in improvements such as institutions of higher education (Clark, 2001). The educational ‘third mission’ - association in socio-economic growth, after that to the conventional missions of research and research, is nearly all relevant in the entrepreneurial institutions of higher education. Joint links with the other innovated factors have improved the vital existence of institutions of higher education in the making of scientific research in due course; invalidate former analysis that rising knowledge diversification production would slacken the function of institutions of higher education in the production of knowledge process.
The Entrepreneurial University as well as has an improved ability to offer students with entrepreneurial talent, novel skills, and ideas. Students are not just the new generations of expertise in a variety of technology businesses, disciplines, and culture etc., however, they can encourage and trained to become firm’s entrepreneurs’ organizers, contributing to economic expansion and creation in the world that wants such results complementary then former. Furthermore, entrepreneurial universities are in addition expanding their abilities of educating individuals and further to educate organizations, all the way through incubation Programmes and entrepreneurship and innovative guidance modules at venues like science parks, interdisciplinary centers, academic developments incubators and project investment (Clark, 2001).

Entrepreneurial institutions of higher education have an improved capacity to produce technology that has altered their place, from a conventional basis of human capital and knowledge to a novel resource of technology production and transmit. To a certain extent only allocating as a source of novel thoughts for existing organizations, institutions of higher education are joining their teaching, research capabilities in new set-ups to grow to be a basis of fresh firm formation, particularly in highly developed areas of technology and science (Etzkowitz, 2004). Institutions of higher education gradually become the basis of local economic growth and educational institutions are founded for this rationale.

2.4.4 Triple Helix Model and Innovation

The Ranga and Etzkowitz (2013) was newly introduced as a logical framework that produces the main characteristics of the Triple Helix relationship into an ‘innovation system’ set-up and it has been defined with respect to mechanism theory the same as a particular set of components, functions and relationships. Amongst the components of
Triple Helix Systems, dissimilarity is prepared between: (i) research and development and non-research and development modernizer; (ii) “multi-sphere” and “single-sphere” organizations; as well as (iii) institutional innovators and individual. The associations among the components are produced into five major categories: technologies transmit, partnerships and divergence moderation, joint leadership, replacement, and set of connections.

In general the functions of the Triple Helix knowledge system and novelty creation, transmission and use are comprehended set of actions in the Knowledge, Innovation and Consensus Spaces. This point of view offers an explicit structure for the systemic communication linking, Triple Helix factors that was missing, in addition to a more better-quality view of the transmission of information knowledge flows and funds inside and amongst the spaces, helping to recognize on hand gaps or blockages.

From the prospective of a Triple Helix framework, the consolidation of the places and the non-linear connections among them can make new mixtures of resources knowledge that can move forward in development theory and practice, particularly at the local or regional level (Etzkowitz, 2004).

2.5 Knowledge Based economy and Triple Helix Model

According to Etzkowitz and Leydesdorff (1995) it has been seen that in the knowledge-based economy of the Triple Helix model, the key organizations have initially been distinct as government, industry, and university. Though, these organizational transporters of an improvement scheme can be predicted to consider double layered systems:
Dually layered systems: first layer of organizational associations in which they restrain each other’s performance, and second layer of well-designed associations in which they figure each other’s prospective or potentials. For instance, the purpose of industry and university relationships can be carried out by diverse organizational measures like relocate workplaces, licensing agreements, spin-off firms, etc. The organizational associations offer us with system data; however, the roles prevailed in knowledge based economy examined on the basis of the transformative dynamics. Furthermore, the knowledge-based economy, based as a particular configuration in the framework of prospects which provides for a conversion method on the organizational measures.

How a knowledge-based economy would function in a different ways from a political economy or market-based economy? The market system initially equilibrates connecting demand and supply. Later on, economic trade associations can be synchronized by political organizations. The study shall criticize that production of structured knowledge has more newly added a third synchronization device to the societal scheme besides political control and economic trade associations. Various studies like Whitley, 1984; Gibbons et al., 1994; Schumpeter, 1964) are also supporters of this view. Three sub-dynamics are again produced as a role in a knowledge-based economy: (1) in the economic capital generation (2) innovation generation of planned knowledge and technology, in addition to (3) governance of the connections between these two renowned sub-dynamics of private and public policy-making or management.

The academic, political, as well as the economic system can be measured as comparatively independent sub-systems of the general public which function with diverse
mechanisms. Conversely, in an attempt to explain their joint interdependence and interface in respect of knowledge formation, one initial requirement to differentiate these mechanisms.

**Patents as events in the three-dimensional space of Triple Helix interactions**

![Diagram showing the three-dimensional space of Triple Helix interactions with Legislative Control: Government, Political Economy, Knowledge Infrastructure, Wealth Generation, Industry, Novelty Production, Science and Technology, and Innovation.]

Figure 2.1: Patents as events in the three-dimensional space of Triple Helix interactions (Source: Leydesdorff, 2012).

The construction, continuously reconstructions of three of the sub-dynamics are in societal relation but not give. They can be measured the same as three spiral working in the lead each other carefully. For instance, a patent measurement is possible as an affair, where the organizational system interrelates (Figure shown above). The relations among
these efficiently discriminated systems drive cultural developments, which have need of a model higher multifaceted than the biological growth model (Luhmann, 1984 [1995a]; 1990).

Biological evolution supposed “natural selection” the same as a solitary assortment device. When choosing repeatedly from one another, it can be projected that two selection mechanisms build up into a co-fruition—the same as in a development of “mutual shaping”. The dynamics amongst three selection methods, conversely, can be projected to go ahead to an advanced extent of non-linearity and consequent complication (May, 1976, May & Leonard, 1975; Li and Yorke, 1975). The consequential multifaceted dynamics progress in terms of regimes and trajectory that modify the scheme in which they come further (Dosi, 1982). In such multifaceted fluctuations, the self-governing variable currently may become the dependent at a subsequent moment.

Therefore, the political and economic system no longer manage, however, function as a selective response system that allow and restrict the technological knowledge and scientific development.

The technological knowledge and scientific development have turned out to be a structural state and a restrictive aspect of additional socio-economic advancement. The critical role of the model (Triple Helix) is to untie the multifarious dynamics of an information based economy based on its arranging sub-dynamics. The recognized model is not an impressive sensational-theory:

It constructs and remains reliant or dependent on the appreciations of the events at the height of the compiling theories. Advancement in the diverse discourses presents the
information. Not, by the way, the Triple Helix model instigated from the technology and scientific study (Shinn, 2002; Slaughter & Rhodes, 2004; Mirowski & Sent, 2007).

It seems that the in terms of domain the model is not specified (for example, national schemes) or précised functions (for example, production of knowledge), however permits for dealings belongings among particular synergies and domains among institutions and functions. The variety of sub-dynamics in the model can be measured from diverse diagnostic viewpoint. These viewpoints may be appropriate and consequently build up as various conversations. According to Nelson & Winter (1982) the neo-classical economics has playing attention on the marketplace as an equilibrating system at all instant of time, while growing economics center on improvements that distress the equilibrium over point in time.

Conversely, the diverse viewpoints can be restructured based on their assistances to the requirements of a knowledge-based economy’s Triple Helix model. Indications on as well as generalization from the measurement of substantive system in support of formalization allows us to recognized knowledge based societal schemes as a multifaceted dynamics of potentials which are précised in variously implied transportations. Political discussion, for instance, be anticipated to function in different ways way as: three interrelated sub-dynamics can be probably to produce hyper cycles on peak of cycles (for example. Business cycles, paradigm changes, and election cycles,) between the reprehensive sub-dynamics. While constitutions in the data build up beside courses, the hyper cycle offers with a next-order rule or regime. This regime expected to have less or more knowledge-based relied on the configurations amongst the mechanisms’ assortment on which assembles at the level of organizational or systematic.
For instance, given that political control and economic interactions are not thoroughly caused by political economy, knowledge production and control can be predicted to exist (Richta et al., 1968). However, there are three levels in knowledge-based economy that can be renowned: the intensity of the records where knowledge is transformed in (for example, economic) associations, level of (for example, institutional) constructions working selectively.

In summary, this model is distinguished both vertically and horizontally. Vertically, the information is organized exposition and the configuration can build up along the trajectory, at the same time as the trajectories are implanted in system that appear from configurations amongst trajectories and structure. Likewise, it has been esteemed the horizontal separation as functional discrimination as in the vertical and the same as social segregation.

Horizontal segregation is supported on divergence amongst the set of laws of statement in the management structures; at the same time as vertical discrimination communicate with the distinction connecting functional dynamics and institutional in the Triple Helix model. Diverse sub-dynamics can be predicted to operate in diverse layers, and to interrelate in the organizations. At the organizational level, well-designed dynamics are incorporated traditionally in one agreement or another and a range of sub-systems are therefore instantiated (Giddens, 1984). These ancient made organizations enables the additional expansion of practical sub-systems which expand in conditions of streams of communication mode with systematic way. Systematically, the institutions cope to allow us to identify the various aspects based on significant parameters. The selection
mechanisms, conversely, stay theoretical conditions with the epistemological position of a proposition.

2.5.1 Core of University-Industry Relations

In university and industry associations, for instance, the organizational arrangements (for example, relocate offices) can be measured based on about how sound they provide the shift of innovative knowledge in swap over for university proceeds. The knowledge transmits procedure may be improved or delayed by the organizational contexts. Therefore, both the institutions and function remain conditional. In addition, the layers can be joined operationally; they may convoy or not. For instance, the market is regulated by political system since it initially uses a code apart from the market system. Conversely, in addition the political systems can even legislation, moreover restructure the market by building market incentives. Local agency and institutional agencies recollect these codes historically. In so far like the three (latent) roles vibrate into a configuration, the generation of the knowledge-based economy becomes possible.

The observable organizations can be anticipated to modify the prospects in a subsequent round. Notice that there is the possibility of more than one arrangement, which is knowledge-based. Same in Australian SMEs is performed well due to core factor of innovation through interaction of university and industry collaboration (Jones & Zubielqui, 2017). In other words, development at the regime level maintains a propensity in the past trajectories or system which are globalizing. The both the layers of organizational stabilization and maintenance in opposition to well-designed restructures are both desirable and can be anticipated to response into all other, therefore varying the
organizational roles, the assortment environments, as well as the evolutionary roles of the diverse stakeholders in following rounds of innovation, change or transition.

According a latest study conducted in Pakistan by Anjum (2016) on University-Industry Collaboration model given below.

Figure 2.1: University-Industry Collaboration model. (Source: Anjum, 2016).
As an industry informant from Pakistan place it, “academics like to theorize, which takes time.” university have the propensity to give the impression of being at various angles of a matter, whereas, the industry is only concerned with work out on particular plans with commercial propositions. This response is echoed by representatives of public funding agencies who grieve over the fact that the majority of industry and university associations are short-term and contractually bound, with extremely little area for basic research or further innovative sorts of examinations. State corporations have associations proposed to construct capacity, and believe in more long-term, in the point of view of informants. These examinations demonstrate the difference that exists connecting universities and in the business group of people. A few number of universities consider that industry does not comprise an intellectual considerate of university activities and structures. As argued below in further detailed, industry informants do not belief universities either.

2.6 Factors Inhibiting the University-Industry Relationship in Pakistan

On the basis of published reports of Transparency International’s (2013), Economists (2011) and according OCDE (2010) following factors are discussed.

I. The nature and size of national economies and research infrastructures

The scope and nature of economy like Pakistan is a chief structural aspect that limits the expansion of university and industry associations. The Pakistan’s imports and exports in 2009 seems only 3% of overall global trade, equivalent nearly to the same as in global gross domestic product (OECD, 2010).
With the prominent exception of Karachi and Northern Pakistan, the overwhelming greater parts of the great corporation in Pakistan are divisional offices of international companies. Judgments on the investment decisions in research and development as well as established institutions of higher education institutions are completed at the head offices. Therefore, organizations are infrequently made with home universities. In this framework, the results of manufacturing investigation and development activities are extensively introduced into Pakistan. In Pakistan it has been seen that along with the roles and functions of multinational companies in Pakistan, the majority of nations are based on home country’s extraction of industrial natural resource. Likewise, the mining industry comprises of 18% of Pakistan gross domestic product (according to OCDE, 2010). The examples given above about the nature of such industries are not often linked to the universities. This has been confirmed through interviews with informer from the mining zones, who admit that the chief associates they have with institutions of higher education are through the terms of the sponsoring of a diverse cultural activities as well as internships for students. Both the university and industry interviewed respondent’s responses portrays associations with the mining industries as typically in one direction investment on the part of the collaborative on separate events and activities, as contrasting to mutual projects. This state of affairs reinforces a continuing lack of belief in local novelty informants talk about on it.
A Pakistan’s university (North Pakistan University) representatives examined that a set of large firms in Pakistan are still in soul “colonial”, with branch offices in the same country as conflicting to have a core business activities. Consequently, it is reasonably complex for Pakistani institutions of higher education to connect with most important corporations. So the multinational companies are avoiding financing their money on research in countries like Pakistan. Supposition that they still seem that to access required and excellent research, organizations are ought to seek associations with the European countries or North America. The author declared that in North Pakistan universities have to persistently deny this perception. This kind of perception tends to mistrust in government research institutions prevailed in Pakistan. Each and every one of the informants identifies the long lasting effects the 1980s and 1990s’ economic crises had on advanced systems in their respective nations. They in addition, expect that the current economic development of their nationwide economies and the enhancements of finance position will provide an improvement to the interactions between the universities and the economy. All through the earliest decade of the 21st century, there is seemed increasing trend in gross domestic product of Pakistan. The facts and figures revealed that the countries like Ethiopia, Angola, and Nigeria are showing 8.4%, 11%, and 8.9%, increasing in their gross domestic product, respectively (Economists, 2011). As well as the same trend expected to continue with different nations like Zambia, Congo, and Ghana to crack the top ten. In general, these signs demonstrate that the economic condition of Pakistan is
enhancing, and informants expect this could render into higher investment in institutions of higher education and research.

II. Cultural differences between higher education and the private sector

The analysis that institutions of higher education act as Ivory Towers is general across Pakistan. Interviewees submitted to the institutions of higher education in Pakistan using expressions like or “exclusive community” or “academic empire”. A non-public sector informant from the nation declared that there is an approach surrounded by several institutions of higher education that there is nothing to find out from industries. And criticized that university faculty compose themselves inflexible to search out them and get in touch with industries, which slowdowns the links from outside stakeholders.

In contrast, the industrial sectors also have slight knowledge of the academic world. Some point out that several industrial owners are deficient in higher education knowledge and training to recognize the culture and context of higher education institutions. The same as industries informant from the nation place it, it is inside the universities’ authorize to supply the resources that industry desires, "after all they receive money from the taxes we pay.” though, this is not an extensively held observation. Higher education institutions in Pakistan are not largely considered as reservoirs of expertise and knowledge to be knocked by other institutions in the society.

Apart from these cultural dissimilarities, informants are joint the usual analysis that university and industry have diverse and different main concerns and
goals. Whereas the non-public sector is alarmed with the end result and comparatively short-term targets, in addition frequently the effect of university activities can merely be determined in the long-term.

Higher education officials and university officials seem to keep in mind long-term affiliations.

III. Lack of confidence in universities

Apart from the cultural distinctiveness among the sectors, entrants explained a particular lack of confidence and trust on the part of industry in universities as potential associates. This need of trust emerged to have various grounds. Primarily, there is a cultural trust on overseas technologies and some doubt of home innovations. Institutions of higher education are consequently not observed as the basis of functional knowledge as well as expertise. Next, the need of experience of industries in dealing with institutions of higher education avoids an additional up to date indulgent of potential opportunities for cooperation.

Furthermore, it is recommended that the cultural confidence on overseas modernization and technologies is a barrier to the development of industry and university affiliations in country like Pakistan. Demonstrating this observation, an informant from the general public argues that the population in Pakistan be liable to favor “imported goods and ideas” at the cost of home innovations and products. In addition sustaining this observation is a Ghanaian research growth administrator who regrets the case of a modernizer in her country under pressure to acquire the concentration of the industry and the general public. It
is believed that one motive for this need to trust in home made products is that modernization in Pakistan are not exceedingly complicated, even though they are meant at explaining fundamental and indispensable problems.

The Industry appears unenthusiastic to go into in long-term associations with institutions of higher education, not merely due to the expenses involved, but moreover due to a lack of assurance in the aptitude of institutions of higher education to convey the appropriate output.

The less confidence influences industry and university associations, as it is irritated by the suspicion concerning the capability of institutions of higher education to formulate related assistance to real-world troubles. The small number of cases of flourishing partnership also adds to this condition, as there is not a “demonstration effect” of optimistic model.

IV. Weak institutional capacity

One more main obstacle to the expansion of collaboration narrates to universities’ ability. Informants point out that institutions of higher education do not have the personnel and structures to connect effectively with industries. Particularly, this capacity shortage comprises inadequate human resources and underprivileged infrastructures. The different Informants from institutions of higher education, the non-public sector and government all identify the need of knowledge within institutions of higher education. They consider that institutions of higher education do not have sufficient competent intellectual management staff to connect with efficiently with the industry.
Exemplifying these observations, a Pakistani informant recognized that the country (the leading economy in Pakistan) requires more PhD alumnae to compete with other countries from other areas of the world.

Further to the need of more specialized expertise, the higher education institutions are not well equipped with desired infrastructure so to be able to meet the demands of both community and private sector.

Institutions of higher education officials interviewed criticized about the chronic less investment in physical infrastructures and research essential to suitably guide their students. They confess that the distresses of the government and industry are justifiable. Conversely, they consider that they are not offered the physical and financial resources to deal with these problems.

In general, institutions of higher education informants think that their establishments are not prepared to execute the missions the public has allocated to them. A continuing lack of human resources and domestic structures to connect with the dynamic sector restrain the growth of industry and university. This is a bottleneck for the growth of joint enterprise. Well qualified academic-industry leaders and government official that can build such connections are dangerous mechanism for institutions of higher education looking forward to contribute new profound to improvements and innovations.

V. Absence of strong leadership for university-industry linkages

Interviewees usually referred to be deficient in suitable leadership in numerous organizations to initiate, support, and guide industry and university connections. A fee number of faculty members interviewed consider that
institutions of higher education, senior administrators do not observe their function to assist the establishment of collaboration with the industry. They recommended a shortage of “champions” for this type of activity on university branches, which could not just indicate to their interest, although offer organized managerial support to them too. With no such industry engagements, leadership is frequently analyzed as marginal activities performed at the only initiative of a small number of individuals.

Several consider that the responsibilities of institutions of higher education administrators is as well as get ways to increase the financial and human resources for the organizations, relatively to simply administer inadequate resources. In Northern Pakistan a government informant declared additional that whereas legal frameworks and supportive policies are previously in place, and institutions of higher education officials still require taking benefits of these prospects by attractive with international and private associates. It is supposed that prospects are there for institutions of higher education administrators to seize, all the way through establishing partnership with marketing and industry the attainments and potential of their organizations.

In Pakistan’s universities the governance model gives the details about the reported lack of schemes on the part of institutions of higher education administrators. In approximately all the regions, institutions of higher education were formed as an expansion of the situation, with well-built public monetary support and the appointment of educational supervisors serve as civil servants at an allotment of the institutions of higher education (Sawyerr, 2004
and Coleman, 1986). Since institutions of higher education were expanded the officials were administrators and civil servants may well not certainly seen as part of their functions to take on further entrepreneurial programs on behalf of their organizations.

In contrast five informants recognized this deficiency of initiatives from institutions of higher education’s supervisors to a required clear national policy on technology, science, and innovation. They consider such as a strategy would formulate clear the associations among every sector, by obviously detailing the jobs of each type of actors, organizations, and stakeholders. Eventually, the responsibilities of the institutions of higher education senior administrators would appear and turn out to be clearer.

VI. Governance Issues
Informants in addition lift the problem of bad corruption and governance at several institutions. The reputation of Pakistan has had the in corruption listed country in the world. Unluckily, this dishonesty emerges in addition have made to approach into institutions of higher education, as analyzed in the current Transparency International’s (2013) Global Report on dishonesty or corruption in educational institutions. This description or report has established, diverse issues formerly addressed in the previous literature relating to the corruption environment that stay alive in various areas of Pakistan. In this situation, in accordance to a small number of informants, horrific governance in universities narrates the non- enforcement of management measures, ultimately, corruption.
Three informants argued in a straight line to corruption considered as a factor in avoiding the university and industry corporation development. Different respondents have the grief on the way how corruption has made the educational institution bad. But the other has the view that this negatively impacted the capability to build up more agreements with local and outside the country partners. It has been recognized that there is much work to be done in recapturing the confidence of potential associates, who have had to face dishonesty and corruption in the earlier periods.

A new aspect of corruption and awful governance concerns the proficiency and well being of individuals in higher positions in universities. A Cameroonian respondent criticized about higher university regulators who are paying attention to engaging politics for personal interest or benefit as contrasting to organization’s interests. It also argued that those parties worried about taking consequential steps to build up their organizations, which may contain a more energetic position in industry associations. Terrible governance has a twofold impact on industry and university associations. Primary, resources are badly administered and there are some other cases of misuse of public resources for personal benefits, chiefly by the public in advert of accountabilities.

This generates an opinion of mistrust towards the institutions of higher education. Secondly, terrible governance contaminates the status of institutions of higher education as a whole, distressing the probability of industry to be keen to connect in associations.

VII. A policy framework to promote university, industry partnerships
Even though, several informants recognized the existence of nationwide policies connected to industry and university partnering, almost 2/3rd of interviewees’ point of view about the lack of policies in their respective nations. Irrespective of the nature of the organization, whether it’s a public educational institution or any private sector all the respondents have the view to establish explicit and clear functions of educational sector that contains the contribution towards overall economic development. Moreover, of the informants declared that the absence of national policy leads to failed political leadership and the overall failure of the perceiving role educational sector.

There is furthermore a stress on the development policies to put into practice. Very frequently strategies are developed without any high exertion to go after their monitoring and accomplishments. Informants have pointed out that the subject matter is that different actors at industries and institutions of higher education leader do not operationalize the strategies. Moreover, laws are approved by the legislature; however, their verdicts of execution are never approved. A few informants consider that governments ought to be lobbied not simply to make the circumstances for flourishing partnerships, but moreover to sustain research and improvement issues on government Programmes.

2.7 Triple Helix and University-industry-Government linkages

This first order decreasing of unreliability can be measured as a formation in the data process to the one that can assign a semantic importance (for instance, by assigning all the factors). The decreasing of unreliability given that the configuration amongst the chief magnitudes differentiated by the next order procedure along with meanings which
build a variation, and therefore points out the degree of which information and knowledge as codified sense can be projected to function inside a system.

This connection shown the operationalization of significance in a gap with diverse distinctiveness affords us with a subsequent step in the complete measurement of the model ‘Triple Helix Model’. This has the sense given that the sub-systems can be measured as approved by the eigenvectors of the set of connections, that is, as concentrations in the structures of infrastructures. The clear discrepancy in the first-order level offers the co-differences amongst these discriminating constitutions. For instance, in form above; patents situated as recognizable measures in a space seemed in vector extended by all the three magnitudes of the Triple Helix model. When all the three or further magnitudes can manage an additional, joint knowledge or co-differences in more than two magnitudes be possible to calculate. The resulting more dimensional co-variance or information can either be negative or positive (Yeung, 2008). Since this increment in the certainty can be recognized for the development. It also considered as a sign of not only self-organized.
CHAPTER 3

METHODOLOGY

3.1 Introduction

The underlying research intends to assess the current linkages between industry and academia while residing in the knowledge based economy that is characterized by the economic competitiveness. The research purpose is to identify the relationship dynamics among industry, government and universities, and redefine the role being played by academia to enhance its productive contribution in the contemporary knowledge based economy, and improve its ability to meet the dynamic market demands. The researcher has chosen the “Triple Helix Model” for providing the theoretical context for the underlying research and analyzing the relationship between industry and universities under the knowledge-based economy. For this purpose, the in-depth interviewing technique has been opted to evaluate the relationship between three key players, that is, industry, universities and government. This chapter “research methodology” outline the important methodological choices made by the researcher. Research methodology offers an outline to the whole investigation, and an effectively designed research methodology, results into highly reliable, accurate and generalizable results, leading towards the solutions of underlying research problems. However, such reliability and generalizability depend on the effective alignment between different methodological components and research objectives. In the underlying case, the justification for each methodological choice be given to ensure the linkage between research objectives and methodological decisions. Overall, the chapter stated that the complete research approach and application of research methodology. The researcher state the methods of data collection and
analysis techniques for executing primary research. Before discussing the important methodological elements, the chapter reminds the research questions and objectives to establish the research design validity.

3.2 Research Philosophy

Qualitative research adopts a flexible approach and enables the researcher to freely collect and interpret the data without any restriction. The interpretive and positivist patterns lie at the a different ends of the similar spectrum of study field. The philosophical foundation for underlying research based in connection of Universities researchers and academic student scholars can either take the positivist or interpretive of academic study paradigms to provide. The positivist philosophical approach is based on the restrictive interpretation and allows the researcher to offer results on logical grounds, based on valid statistical evidence. Whereas, interpretive paradigm suits well when researcher intends to conduct an in-depth exploration of an underlying phenomenon by collecting qualitative insights from the comparatively small sample size. Present study adopted the the underlying study approach. The main purpose of the researcher has to qualitatively analyze different dimensions surrounding the underlying phenomenon. Therefore, Scholar has preferred the explanatory logical approach. The interpretive approach suits well while evaluating the three-dimensional relationship between industry, academia and government.

3.3 Research Time

The academic researchers can either chose the longitudinal or cross-sectional research time-frame to execute the empirical research. The choice of the timeframe depends on the nature and objectives of the research. The longitudinal research design is
chosen when a researcher intends to gather the data at more than one time-period. This research design offers more reliable results and suits well while assessing the causal relationships among study variables. In longitudinal studies, the time factor gives considerable importance. However, these studies are more time and resource-intensive than cross-sectional research. The cross-sectional researchers collect the data at only one time-period and share the current snapshot of underlying phenomenon. Considering the time and resource constraints, the fundamental of the study has selected the cross-sectional research design. The purpose of this research approach is to analyze the current relationship dynamics of industry, academia and government and research doesn’t require to consider the time factor.

3.4 Research Approach

The qualitative approach is most commonly used in the behavioral studies such as sociology, social sciences, etc. The social research methodology is categorized into qualitative and quantitative methodological approaches. Both approaches derive the foundation from opposite philosophical paradigms. In academic research, two research approaches are available to the academic researcher for conducting the primary research, quantitative research approach and qualitative research approach. Both research approaches are completely opposite to each other and have their own merits and demerits. The quantitative approach is mostly used in the scientific researches and natural science studies. Quantitative researchers aim to quantify the relationship between understudy variables and propose the findings backed with valid statistical evidence. One of the major strengths of quantitative studies is the reliability and generalizability of findings due to statistical nature and large sample size. However, one of its major limitations is a
restrictive interpretation that hinders the researcher’s ability to unveil unexplored insights. Whereas, qualitative research studies are beneficial while exploring a new phenomenon. This research is chosen when the researcher has a little knowledge about an underlying phenomenon and intends to collect the data from a specific population group.

3.4.1 Philosophical paradigms

Positivist philosophical approach supports the quantitative research approach that refers to a research practice derived from the field of natural sciences. This philosophical approach interprets the reality on logical grounds and guides the researcher to adopt a completely neutral position while viewing the reality. Positivist philosophy defines the epistemological assumption as objectivism, which suggests that facts and knowledge prevail in a context and time free context, and proposed results could be generalized and readily available for individuals seeking to explain that underlying phenomenon. Mostly researcher suggests that the social investigation studies persistently target the prediction through the positive perspective. It is cleared the clarification and regulator of the world and its dimension depends on the numerical and hypothesized facts (Guba and Lincoln, 1994; Scott and Usher, 1999). Mostly, the quantitative studies initiate with a generalized view of a social phenomenon and afterwards, explore a particular dimension to statistically assess the nature and strength of hypothesized theories. Additionally, quantitative research approach conceptualizes the reality by testing the relationships between understudy variables identified through a theoretical framework.

In contrary to the quantitative research strategy based on the positivistic philosophical approach, the qualitative research derives the philosophical foundation from an interpretive research paradigm that lies at the opposite end of the spectrum. The
interpretive philosophy agrees with the relativist perspective, which views the reality existing as complex mental constructions. Such mental constructs are based on the differential experiences and socialization. Under this paradigm, the reality constructs as a result of interaction between the world and active subjects (Giddens, 1976). Moreover, this paradigm argues that researcher cannot understand the complex constructs of reality until it becomes the part of it. The qualitative researchers actively engage themselves in on-going relationships and activities to gain an in-depth understanding. Interpretive researchers regard the knowledge as complex human construct and share an alignment with the epistemological position of subjectivity. Hence, the qualitative approach is chosen when an underlying study intends to explain and understand the on-going events and social relationships through directly experiencing the reality (Cohen, et al, 2000). Usually, the qualitative studies aimed at developing theoretical propositions on relationships and social events based on empirical data.

3.4.2 Justification for the chosen research approach

Considering the standpoints and arguments of both qualitative and quantitative research methods, the scholars approve that it is not possible to regard a single approach successful in all conditions. Each approach has its own limitations, while explaining the relationships and social events in complex settings (Schulze, 2003). If the researcher has adequate time and resources, then multi-method research is recommended, where, the study combines different methodologies to best serve the underlying research purpose. It is also called triangulation approach, where, multiple data sources are used to understand the context in depth and breadth (Creswell, 2003; Schulze, 2003). Present study used the qualitative based narrative approach for collection of individual statements, conduct a
some depth interviewed from respondents or individuals have experience the practices of oppression (Creswell, 2014). The triangulation approach allows the researcher to strengthen the reliability and validity the reported results, utilize the strength of each approach and minimize the limitations and get enriched information about an underlying phenomenon (Sarantakos, 1998).

The underlying research has chosen the qualitative research design and data was collected by employing the structured interviewing technique. The justification for choosing the qualitative research approach is that it enables the researcher to highlight different underexplored or unexplored factors affecting the linkages dynamics of industry, academia and government. The researcher has also proposed the business process model based on qualitative interviewing technique. The justification for the chosen research method can also be given by creating a linkage between research objectives and methodological choice. The underlying research has two main research objectives. Firstly, the researcher intends to explore the relationship dynamics between industry and universities in the Pakistani context. It can be done by conducting an in-depth research that can connect the mental constructs and create a meaningful picture of this multifaceted relationship. In this case, the qualitative research approach best serves the purpose. Hence, the researcher got the qualitative insights from 25 Pakistani organizations operating in the education and industry sector. The reason for choosing the sector is that currently, it is one of the most competitive industries and has a high economic value due to its size.

The second main research objective is to understand the perceptions, experiences and perspectives of individuals that are directly involved in such relationships. These
actors play a significantly important role in shaping and reshaping those collaborations between industry academia and government. The qualitative approach based on the constructivist and interpretivist paradigm enable the researcher to conduct in-depth interviews that can generate important insights about the related opinions, experiences and issues associated with such multi-dimensional linkages. The underlying study also propose the recommendations based on qualitative research. To gain a comprehensive understanding, the researcher interview the senior leadership and management of related organizations/institutes. Moreover, The method suggested by Triple Hielix Model of Universities ,industries and Government linkges (Etzkowitz and Leydesdorff, 2003) was adopted in-depth interviews with the third party individuals were also conducted that play a significant role within the chosen sector.

3.4.3 Forms and Nature of Data Required

It contends that the linkage between the content and method is developed through data. Hence, the study design starts to developing as the researcher decides which type of data is required to resolve the underlying phenomenon (Punch,1998). The underlying study intends to yield the sufficient data that could be used to understand the multifaceted collaboration between academia, industry and government. However, the successful accomplishment of this objective requires an in-depth understanding of the relationship dynamics and perspectives of the concerned authorities about the current and expected future state of the relationship. Only then the researcher would be able to offer meaningful recommendations. The researcher would require collecting the general information about the current linkages and detailed investigation along with probing
strategy would highlight the possible gaps between industry and academia. Such perspectives can only be explored by employing the qualitative approach.

3.5 **The sample and sampling techniques**

The researcher has used the purposive sampling technique to conduct the qualitative research. This section shares the important details about choosing data sources and how the primary research be conducted by collecting data from multiple primary sources. In cases of restricted resources and identified the collection of valuable information, a purposive sampling technique is more effective and generally used in qualitative research (Patton, 2002). The phenomenon of attention to a specific area, especially knowledge, practical experience that includes classifying and choice the individual or group of individuals to get the desired results (Cresswell & Plano Clark, 2011). Bernard (2002) and Spradley (1979) stated the importance of experience, individual opinions and express in good manner, and respondents availability to provide the information in readiness and willing to participate without identification. Therefore, purposefulness sampling is choseed to ensure the minimize potential for bias during findings and possible effect the known and unknown individual.

Moreover, the researcher received the guidance from semi-structured interview guides for developing the reliable and valid instrument. The qualitative instrument was used to collect the valuable insights from educational institutions, industry and related government organizations to get the current perspectives. The research explored the issues highlighted from the critical review of the literature. The identified factors are important to explain the underlying phenomenon and fulfil the underlying research objectives. The data collected from the in-depth interviews mainly explained the “why”
behind all identified factors affecting the linkages between government, academia and industry, and “how” factors that could answer how these relationships can be improved to enhance the competitiveness and equip the graduates with latest employability skills.

3.5.1 Data Sources

The data sources can be broadly divided into two main categories: primary data sources, and secondary data sources. The secondary data sources were mainly comprise scholarly articles, published reports, government documents, annual reports, company websites and a comprehensive review of past theoretical and empirical studies. These sources were offer adequate information that could be used to provide a firm theoretical foundation for underlying research. Primary data sources for the underlying research include in-depth structured interviews with the higher education institutions and senior management from the corporate world.

3.5.1.1 Data collection instrument for industry

To devise the data gathering tool for the business firms, the scholar conducted a detailed review of related concepts and theories. The main focus of the literature review was to theoretically analyze the relationship between industry and universities within a knowledge based economy. After conducting a comprehensive review, following variables were identified:

- Firms’ competitiveness policies
- Industrial development and increased role of innovation
- Effective knowledge management and technological advancement
• Human resource management and development in terms of marketing and productivity
• How the companies operating in highly competitive industries collaborate with research institutes, universities and related institutions for enhancing innovation and competitiveness.

3.5.1.2 Data collection from Universities

Based on the study, the underlying research has identified the variables to explain the relation model. Two main variables within the “universities/academia” are policies and functions.

Within the universities’ policies and infrastructure, following themes have been identified:

• Universities’ policies on enhancing the relationship and linkage between UIG related institutes/organizations to better serve the industrial sector and enhance the sustainability and competitiveness.
• The universities’ positive attitude towards making close collaboration with industry
• The prestige and reputation anchoring the advanced technology in choosing sector
• The high-quality in management and engineering
• Getting adequate funds from the external sources.
• Proximity to the university and cluster.

Within the universities’ functions, following themes have been identified:
- Producing high-quality academic output in the form of highly skilled graduates
  - Number of graduates and post-docs within the field of different industry
  - Conducting industry-relevant skills training within under-graduate coursework.

- Research and development activities
  - Providing the ready to use, highly productive knowledge to support the cluster
  - Developing a research partnership with industry
  - Research for invention and innovation
  - Competitive research and commercial development with secured intellectual property rights.

- Academic services
  - Incubation service
  - Career services, career placement, partnership with industry to conduct training sessions
  - Entrepreneurial development
  - Technical assistance and industrial extension
  - Ease of technology transfer from institute to the firm.

The universities can collaborate with the organizations in two ways:

  - Developing informal relationships with the firms
  - Developing formal relationship with the firms

- Another important research variable is the “firm” that comprises policies and development, including:
o Policies about the competitiveness
o Innovation and industrial development
  ▪ Productivity development
  ▪ Marketing development
  ▪ Human resource development
  ▪ Technology development
  ▪ Knowledge development and management
o Finally, the relationship with the government institutes, universities and related organizations for fostering innovation.

3.5.1.3 Data collection from Government

This research has two important dimensions, including the policies and collaboration with the firms and universities. The identified themes within this category are explained below:

  o Technology transfer
  o Academic collaboration
  o Financial support
  o Academic support
  o The policy of the research institute’s towards collaborating with firms and universities for strengthening the competitive positioning.
3.5.1.4 Related Organizations

Within the “related organizations” category, the researcher has identified two important themes, collaboration support and policy to assist the universities and firms, including:

- Supportive and collaborative policy towards the firms and universities in strengthening the competitive positioning.
- Developing the meaningful collaborations with academia
- Providing financial assistance to the universities and firms for enhancing research innovation.

3.5.1.5 Government

Within this area, following themes have been identified:

- Commitment and favorable policies to assist the chosen automotive industry
- Provide the financial assistance to the revolving organizations and educational institutions
- Development of a cluster and forum of academia-industry
- Policies to develop the testing equipment and service center for supporting the industry.
- Policies to foster the collaboration among government institutes-related organizations-industry-universities.
3.6 Scale Refinement

To collect the data from the academia and from higher education institutions, the scholar sent the structured interview questionnaire to instructors and professors from universities. Whereas, data from the industry was collected from industry experts. The researcher analyzed the content validity based on the reaction received from respondents. The collected responses were further used to re-mark for information probing and for refining the interview guide. Eventually, the final interview questionnaire was prepared after some adjustments (attached in appendix A).

3.7 Data Collection

The researcher conducted the in-depth interviews from October, 2016 to January, 2017. Potential interviewees were personally contacted by the research and research purpose was explicitly communicated to get an informed consent. After getting the consent, the date and time for the interviews were fixed followed by a confirmation letter or an e-mail notification to take the written consent. Afterwards, the researcher shared a general idea about the research and the interview questions. The interview guide (attached in appendix A) provided an overall structure during the in-depth discussions so that themes can be easily identified at a later stage. However, the probing strategy didn’t allow the researcher to strictly follow the discussion pattern. The data were collected from five government institutions, twelve industry representatives and seventeen university top level officials by conducting in-depth interview.

In qualitative studies a numeral of issues can affect by the sample size, the principle of managing the sample size should be clear, more than five hundred qualitative Ph.D studies analyzed with sample size. The outcome indicated the mean of sample size was
Whereas some qualitative research specialist side step the subject of “how many interviews are sufficient, suggested as least to focus on the power of information. A number of books, book sections and researcher endorsed the five to fifty respondents/participants as adequate for the qualitative in-depth interview approach (Dworkin, 2012).

The Present study sample profile is given below;

**Number of Sample and Profile**

<table>
<thead>
<tr>
<th>Sector/Institution</th>
<th>No of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>5</td>
</tr>
<tr>
<td>Industry</td>
<td>12</td>
</tr>
<tr>
<td>Universities (Public and Private)</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
</tr>
</tbody>
</table>

3.7.1 Data processing

The qualitative insights obtained from the in-depth interviews were firstly transcribed to analyze the text. The researcher analyzed the data by focusing on the implications of linkage between government, industry and academia. The implications were highlighted with an aim to apply them in real world context for enhancing innovation and competitiveness.

3.7.2 Questionnaire design

The underlying research has employed the well-structured, well-designed and validated questionnaire for data collection. The reliability of the research instrument
directly affects the overall research quality. The first section of the structured questionnaire collected important demographic information from the study respondents, such as respondents’ qualification, organization, experience, gender and age. The second section of the questionnaire gauged the important insights about relationship dynamics. This part was designed to explore the viewpoints and perspectives of the study respondents.

3.8 Data Analysis Techniques

The researcher analyzed the collected data by employing different research software. The qualitative insights were discussed with the help of NVIVO and content analysis. The use of secondary and primary data sources enabled the researcher to provide a comprehensive model for enhancing the university-Industry and government linkages in Pakistan. For this purpose, the researcher analyzed different reports to analyze the current situation of Pakistani academic sectors.

3.8.1 Overview of data analysis steps

This section of research methodology was offer an overview of data analysis steps that were carried out to conduct the underlying research. The data analysis steps are summarized below:

- At first, the researcher conducted the pilot study by executing the preliminary interviews with professionals from industry, heads of universities and government institutes.
- The in-depth interviews were analyzed by using Content Analysis techniques.
Afterwards, the researcher designed the process model and Content analysis and NVivo software was used for this purpose.

3.9 Process Model

The process model was developed after following a series of steps that led towards a comprehensive understanding of the underlying phenomenon. The suggested that within the university and industry and government institutions, the processes are like a complicated web that connects different work activities. The proposed process model presents one or more processes along with important associations performed by enterprises. Process modelling is a mechanism that communicates and describe the anticipated or present state of business processes. Within the process modelling technique, the workflow and mapping enable the researcher to understand and analyze the processes that can be used to bring positive changes to the enterprise. The process methodology gives the fundamental importance to “flow diagrams” to visualize the collaboration dynamics (Smith et al., 2003). Goedertier et al, (2013) have discussed different approaches within the business process modelling research, such as hybrid process modelling paradigm, imperative and declarative paradigms. These paradigms are contradicting nature and are entirely different from each other.

The declarative modelling process focuses on the exploration of different ways of achieving business goals. However, this processing paradigm doesn’t offer an adequate explanation about how the researcher can reach the end state. This is the reason why different process models are perceived to be limited to offer a complete understanding. The process models show limitations, business rules, circumstances and other logical expressions, which state the characteristics and dependencies among various business
process activities. Imperative process modelling techniques focus on the language while defining the overall control-flow of different business processes within graph based modelling. At present, these techniques are commonly employed within the process modeling approach. Control-flow dependencies and activities are the two fundamental constructs within a graph-based process modeling languages. Such activities and dependencies are visualized by nodes and directed arcs. Recently, the two fundamental process modelling techniques, imperative and declarative constructs have been combined to form a hybrid process modelling. These hybrid approaches offer the flexibility as a service to enhance the understanding (Van der Aalst et al. 2009). Moreover, the Kumar and Yao (2009) have also discussed the process materialization approach. Caron and Vanthienen (2011) have also shared a comprehensive summary of such hybrid process modelling approaches. Considering the strengths and limitations of each approach, this research has chosen the hybrid modelling technique that enables the researcher to understand the business rules, expressions, events and overall control-flow within under-observation processes. The mixed method research approach enabled the researcher to propose a detailed process model.

3.10 Limitations

Alike any qualitative research, the underlying research also has some limitations. The researcher faced difficulty in gaining access to respondents and then convincing them to take part in the in-depth interviewing process. Due to the concerns related to information disclosure, the data collection through questionnaire was also challenging. With surveys and interviews, the interpretation of the respondents’ perceptions can play a limited role in understanding the underlying phenomenon. However, these limitations
don’t indicate the finding’s invalidity. The researcher was interpreted the perceptions shared by respondents according to the prevailing context.

3.11 Ethical Consideration

Ethics represents the set of conventions, principles and rules that provide a framework for actions taken by social members and their socially acceptable behaviors (Anderson, 1990). Within the social research, the researcher considers the ethical issues at every phase of research to lessen the impact of possible biases and harms. The fulfillment of ethical standards maximizes the underlying research’s quality (Cohen & Manion, 1994; Anderson, 1990). Researchers have highlighted five common ethical concerns associated with the social research (McNamara, 1994), including the accuracy of results and conclusion, ensuring the confidentially and anonymity, respecting the privacy of respondents, ensuring that the participation is voluntary and assuring the informed consent. This section was describe how each ethical concern is addressed while conducting the underlying research:

3.11.1 Informed Consent

Taking the up-to-date consent from the study respondents is one of the most important ethical concern. It requires the researcher to inform the respondents about underlying research purpose. The research instrument should be explained and purpose should be clarified to ensure that respondents are well-informed about important research elements such as intended research audience, the study’s sponsor and rationale behind the chosen research area (McNamara, Ibid).
In the underlying case, the researcher explained the study purpose through email by stating that the research was being carried out as partial fulfillment of the PhD degree. The researcher further communicated that the findings might be useful for the involved parties and policy makers to gain an adequate comprehension of relationship dynamics and take steps for further enhancement. The interview content was also explained to the interviewees before collecting the data to avoid any confusion.

3.11.2 Voluntary Participation of Participants.

The researcher also ensured that all study participants participated on the voluntary basis. But sometimes, taking the fully informed consent results into the low response rate. McNamara (Ibid) regarded the low response rate as a response bias. However, this bias could be diminished by using multiple contacts. In completion of underlying research, the researcher used minimum 4 contacts for each potential informant so that high response rate with free consent can be ensured. Firstly, the contact information was confirmed by contacting the target audience through email or call. Secondly, the researcher sent the letters explaining the purpose and important details of research to all potential respondents. Thirdly, after one week of letters, the researcher sent the questionnaires and appointments for an interview. Fourthly, a reminder with a letter of thanks was emailed within ten days. When the questionnaires were mailed to the participants. Lastly, the researcher called the respondents after 3 weeks who didn’t respond before to recall them to complete the study questions.

3.11.3 Respect for Privacy

Admiration for the confidentiality is one of the most important ethical considerations. The academic researchers stress the need to ensure the respondents’
privacy and contend that privacy must be ensured at every cost to produce the reliable results and eradicate the risk of unwanted interference or fears. The concern for the respondents’ confidentiality also includes avoiding discomfort and embarrassment of participants during the data collection process (Bryman, 2004; McNamara, Ibid; Cohen & Manion, 2004). In the underlying case, the researcher didn’t include any sensitive question during the pre-testing of interview and survey questions to avoid any potential discomfort or embarrassment. Moreover, the researcher also ensured the anonymity factor to prevent any harm caused by violation of respondents’ privacy during the data analysis process. Further details on privacy and confidentiality are described below:

3.11.4 Research Ethics and Confidentiality of Data

Many researchers have highlighted the importance of ensuring the privacy and confidentiality of study respondents. The participants’ confidentiality is ensured by ensuring the “anonymity” factor throughout the research. It implies that all information disclosed to the general public were avoid the identification of the participants based on their responses. The confidentiality of the information is ensured by deleting the identifiers from freely and easy access to distributed data. In the underlying case, researcher explicitly to communicate the respondents about confidentiality during data analysis by stating on the email covers (McNamara, Ibid; Pulmer, 2001). The personal information was kept anonymous and researcher only used this information during the follow-up process. Before data analysis, the researcher asked the respondents if their personal information could be disclosed by sharing the organization name. Moreover, the respondents were also showed the related information that may appear on the privacy check.
3.11.5 Accuracy of report and results

“Accuracy of the reported results” is the 5th important ethical guideline that must be considered while conducting the research (McNamara, Ibid). The researcher must accurately report the results according to the relevant methodological guidelines. The development in the academic field involves openness, honesty and dignity. It is the researcher’s responsibility to accurately report the results and honestly discuss the strengths and weaknesses of the research. In the underlying case, the researcher has also adopted an open and honest approach to reporting the positive (strengths) as well as the negative aspects (limitations) of the research.

Contending on the same note, the Sekran (2003) has commented that researchers address various ethical concerns while conducting primary research, ranging from stating the research purpose, ensuring the data confidentiality, respecting the privacy of respondents and not enforcing respondents to ensure a timely response. The truthfulness and honesty are amongst the most important characteristics of a researcher for reporting ethical and reliable results (Sekran, 2003).

Cooper and Emory (1995) commented that different ethical issues within the academic research must be avoided to report the most reliable results. These highly important concerns include avoidance of legal liability, invoicing irregularities, deceiving people, misrepresenting findings, violating the confidentiality of study respondents and violating nondisclosure agreements (Cooper and Emory, 1995). During the execution of underlying research, the researcher ensured that the research purpose was clearly communicated and completely understood by all respondents so that reliable and informed results could be reported. It is the right of the respondents that their privacy and
confidentiality is fully insured throughout the research (O’Sullivan & Ressel, 1989). Overall, the researcher has fulfilled the important ethical standards, providing necessary information to respondents and hiding their personal information (also the organizations’ name) from the public.

3.11 Content Analysis

According to Bernard Berelson, Content Analysis is “a research technique for the objective, systematic, and quantitative description of the manifest content of communications” (Berelson, 74). We use content analysis in research to analyze internal features of media and actual text/content. It is used to define the occurrence of certain words, subjects, sentences, themes or characters within contents or sets of texts and to quantify the objectivity in the specific content or text. We can define text or content in shape of chapters of the book or books, interviews, essays, newspapers, articles, headlines and discussions. It also includes conversations, speeches, advertisements, historical documents, theater and plays. To perform content analysis, coding is being done with text. To code the content or text, text is further divided into manageable groups according to different levels. Division of content can be on the basis of words, word sense, sentences, phrases or theme, then it is tested by using basic methods of content analysis i.e. conceptual analysis or relational analysis. Then results are used to draw a conclusion about the subjects within the content, the author(s), the culture and the audience. For example, content analysis can specify valid structures about the content as it can give comprehensive exposure about intentions, preconceptions, biases, oversight and prejudices of writers, and all other publishers that are responsible for the material’s content.
Cavanagh states that content analysis is a research technique that has been widely used in health studies in the last years. By using content analysis as a research method, more than 4000 articles were published between 1991 and 2002. Researchers consider content analysis as a flexible/convenient method for textual data analysis (Cavanagh, 1997). Content analysis defines different kinds of approaches to analyze textual data starting from intuitive, interpretive and impressionistic analysis with systematic and rigorous analysis of texts (Rosengren, 1981). A certain type of content analysis opted by a researchers, according to their interests in theoretical research and the problem statement being studied (Weber, 1990). Due to this flexibility, content analysis is very useful for different kind of researchers; the lack of proper definition and rigorous procedures is likely to be limited to the application of content analysis (Tesch, 1990).

The difference of Analysis of content typically limited to categorize it in qualitative versus quantitative research methods. For more thorough qualitative content analysis, there are different analytical procedures through which a comprehensive analysis potentially sheds light on the major problems that researchers are studying, so muddling methods can be avoided (Morse, 1991).

History of content analysis starts from 18th century in Scandinavia so it has such a long history (Rosengren, 1981). At the beginning of the 20th century, the United States used analytical technique for the very first time in content analysis (Barcus, 1959). In recent years content analysis is only used as a qualitative or quantitative method by researchers (Berelson, 1952) Later on, it was mainly used as a quantitative method by coding textual data into clearly defined categories and then quantify through Statistics. This technique is also stated as quantitative analysis of qualitative data (Morgan, 1993).
For analyzing textual data, qualitative content analysis is one of the most commonly used research methods. Other methods of qualitative content analysis are also practicable, such as ethnography, historical studies theory on earth and phenomena. While analyzing through qualitative content analysis, it focuses on properties of communicating language by paying attention to the context or contextual meaning of the text (Bodh, Thorpe and Donohew, 1967; Lindkvist, 1981; Peru Le McTavish, 1990). Data can be in the form of print, verbal or electronic media and we can get it from narratives, surveys, focus group, open label study surveys and in-depth interviews. We can also gather it from print media in the form of books, articles and manuals (Kondracki Wilman, 2002). Qualitative content analysis basically examines the language intensively to categorize large amounts of text in the effective number of categories of similar meaning text (Weber, 1990). These categories may constitute an explicit or inferred communication. The main purpose of content analysis is to provide knowledge and understanding the phenomena being studied (Downe-Wamboldt, 1992, p. 314). We are using qualitative content analysis in our research to interpret our content but first we have to know about different kinds of content analysis and have to opt best of them.

One is a Conventional content analysis. It is normally applied to the study, which aims to describe the phenomenon. This type of research design is usually used when research literature or theory about the phenomenon is narrowly or limited. So researchers avoid using pre-design theories. Researchers are reviewing data in order to allow for the emergence of new concepts (Kondracki Wilman, 2002), described category development
through the induction theory process (Mayring, 2000). And this shares several initial approaches of study design, analysis and qualitative testing.

To gather data in content analyses if the interview is opted as a tool, then open ended questions are used. Investigations are usually open ended and participants’ comments are essential as compared to pre-existing theories. We start data analysis by reading text repeatedly to achieve and understand the actual meaning of the whole and give them code (Tesch, 1990). To do the same, first to highlight an exact word within the given text or content to get the main idea or concept; so that researcher can make a close comment by first impression, initial analysis and thoughts (Miles & Huberman, 1994; Morgan, 1993; Morse et al., 1995). And continue this process to code the text and then label the codes to get an idea to reflect one or more than one key thought often they come directly from content or sometimes there is a need of an initial coding scheme. Then we arrange the coding categories in the form of group codes according to their classification that how much they relate or different with each other. Then we organize grouped codes into meaningful clusters (Coffey & Atkinson, 1996; Patton, 2002). Usually numbers of clusters are 10 to 15 and to maintain clusters, large number of codes are sorted in them (Morse & Field, 1995).

The researcher can organize or arrange a larger number of categories into smaller number of categories by keeping in view the relationship between subcategories. A tree diagram can be made to organize hierarchal structure to develop an understanding regarding categories (Morse & Field, 1995). And after that for each category and subcategory, codes would be developed. Then patterns for each code and category are made for preparation of reporting related to the findings. According to need of research, the
The researcher may decide to determine the association between categories and subcategories, on the basis of their antecedents, significance or concurrence (Morse and Field, 1995).

The advantage of conventional content analysis is that in this kind of research the researcher gets information directly from respondent and captures each and everything related to research very clearly whether these are emotions, impressions, or pitch of voice of the interviewee. Moreover, researcher is not imposing pre-existing theories or theoretical perspective in the case of using conventional approaches. Knowledge generated from conventional content analysis is based on actual participants’ exclusive perception. The main purpose of conventional content analysis was to capture the complexity while performing research.

But this research analysis technique has one disadvantage that in this type of research, researcher may get fail to understand the context so in this way researcher fail to identify main categories. So it may lead to represent data unclear and vague.

The second content analysis technique is directed approach. According to this approach, sometimes existing theories or previous researches are limited or incomplete or need further descriptions about a phenomenon. So directed approach might be opted by a qualitative researcher for content analysis. According to Potter and Donnerstein Levin (1999), in direct content analysis deductive theory method is being used. The goal of directed content approach is to control conceptual framework and expansion in existing research. Previous researches and already existing theories can be used to develop research questions. The researcher can also get an idea about variables of interest and can
estimate the relationship among variables and then define preliminary coding scheme and the relationship between codes. It can be referred as a deductive category application (Mayring, 2000).

Directed content analysis approach in content analysis is comparatively more structured as compare to conventional content analysis (Hickey and Kipping, 1996). On the basis of prior researches and existing theories, researchers define key concepts and initial coding categories. In this kind of research, if data are collected through interviews so open ended question might be used by asking targeted questions about predetermined categories. For such type of analysis first step is to gather primary data. If the interview is used as sampling technique so as tool open ended question are used with predefined categories. The purpose of open questions is to experience facial expression and body language of the participants’ such as acceptance, depression, anger and bargaining. Data collected in this way is coded in two different ways. If objective of research is to define and classify all events of some specific phenomenon, i.e. time to time emotional reactions. Then it would be helpful to study transcript and highlight all content that is related to the first impression. Afterwards analysis would apply to code all highlighted text by using predetermined codes. In last new codes are allocated to all those content which cannot be coded by the initial coding scheme.

According to the second strategy for direct content analysis, coding can be started immediately with predetermined codes. Data which cannot be code would be defined and analyzed later to determine whether it belongs to a new category or sub category of already existing code. The option that which approach regarding direct content analysis would be opted totally depends on the data and the goal of the researcher. If the
researcher wants to capture all possible occurrences of the phenomenon, such as emotional reactions, highlighting the text that has been identified without coding can increase the reliability. If researcher feels confident that the initial coding is not a means of identifying the text in question, then the coding can begin immediately. Depending on the type and breadth of the class, researchers may need to identify subcategories with subsequent analysis.

The results of direct content analysis provide guidance and evidence that can be supportive or non-supportive of the theory. The evidences provided by direct content analysis can defend by presenting codes with the help of descriptive evidences. So a comparison of study designs and analysis can be done easily by using different kind of statistical tools in coded data and moreover frequency of codes can be used to rank order of comparisons (Curtis et al., 2001). Researchers can explain their findings and occurrences with the help of codes representing main categories (Kübler-Ross 1969) and newly identified demonstrative and emotional responses. Through this it can also be reported that how much of total codes are supporting or non-supporting from each participant and total sample.

The objective of using prior researches and theories is to get help in discussion of findings in current research. And new identified categories give opposed view of particular phenomena, or would refine, expand, enhance and enrich the already existing theories (Kübler-Ross’s 1969). So, this approach in content analysis may support and extend existing theory. Moreover, this kind of research results in increase in the area of research and is often seen as hallmark of natural design.
Third type of content analysis approach is a summative content analysis. In this type of research, summative content analysis begins with classifying and measuring some specific words or phrase in content to understand the use of text or content. This estimate does not deduce a useful experience, but to investigate its use. Analysis of appearance of a specific word or phrase in textual content is also known as manifest content analysis (Potter & Levine-Donnerstein, 1999). After selecting specific words or content, frequency of these words or content would be considered (Kondracki & Wellman, 2002). But actually summative content analysis technique is something different. It considers not only specific words, but also investigate hidden features within the given text and then to interpret the findings (Holsti, 1969). According to another research, interpretation is the main focus point of researcher (Babbie, 1992; Catanzaro, 1988; Morse & Field, 1995).

In this type of research, first we analyze occurrences of specific selected words by hand or automatically by a computer. Then word frequency, calculation is being done and in the meanwhile source and speakers would be considered too. It is used to understand the terms clearly and simply. Counting is used to define patterns of the data and for coding (Morgan, 1993). It allows for interpretation of the context associated with the use of the word or phrase. Researchers try to explore word usage or the range of meanings that a phrase can have in normal use.

Moreover, qualitative content analysis; all analytical procedures are done in same seven steps. These steps include research question which is needed to be answered, selection of the samples on which analytical procedure would be practiced, identifying categories to be used, highlighting coding process, training of the coder, performing coding process, ensuring reliability, analyzing and interpretation of analytical findings (Kaid, 1989).
Coding process is a key task in performing qualitative content analysis. This process is done to categorize the huge amount of texts into some specific categories (Weber, 1990). These categories are themes or patterns that articulate directly analysis which is being needed in the analysis. After that relationship between categories are defined. While coding, coding scheme is developed to guide coder in order to analysis content to make decision and get findings about research. According to Poole and Folger (1984) Coding scheme is a translating device that arranges data into categories. Coding also define logical, methodical scientific rules and procedures of data analysis. This scheme is considered reliable in data analysis (Folger, Hewes, & Poole, 1984).

After reviewing the types of content analysis we come to know that the basic difference between these three approaches depends upon that how codes are developed. In conventional content analysis, researcher derives categories of collecting data so codes are developed during data analysis and this study start with observations. In directed content analysis, research study starts from existing theories. And the code is already defined in this approach, but more codes can be developed depending upon the needs of researchers. This approach is used to refine and extend already existing theories. Summative research is different from above two. In summative analysis coding is done on the keywords in the content.

I have adapted direct content analysis approach in research as this type of analysis based on deducing method. It took existing theories and then codes are developed on predetermined categories existed in these theories. New codes can be developed according to needs of researchers. It is a useful approach as it is used to refine preexisting theories. Moreover, it can extend knowledge regarding some specific topic. It also
provides a platform to the researcher that a researcher can use research articles and data and then can find out an area where research can be performed. It also provides guide lines in shape of already defined categories. In this way the researcher can use that predetermined category for the coding process.
CHAPTER 4

RESULTS AND DISCUSSION

4.1 Interview Plan for Universities, Industry and Government Institute

4.1.1 Interview Plan for Industry / Firms

1. Does your organization have strategies on Business’s competitiveness?

Firm’s effectiveness and policy formulation are significantly important for any firm. One of the respondents said, “Yes, our firm has policy for competition to comply in all respects with all applicable competition and antitrust laws.” Another respondent said, “It is very necessary for our firm to make the policies for competitors and to grow in the sub-sectors in the country. We regularly revise our policies as per requirement of market”

Decision: No doubt policies for firms competitiveness are very important, today’s every firm/industry is paying attention toward their competitiveness and explore the new local and international markets for growth of business.

2. Does your firm have policies on creating the linkages with universities and government institutes?

For the industry and the academia linkage role of industry is also very important. Are firms paying attention toward this or not? We have asked this question from firm’s respondents. One of the respondents said, “Yes, we use to arrange regular visits to universities to recruit talents. Our firm has its own research centers. Also, recently in 2017, we have signed a collaboration agreement with a university. The agreement transform the way we engage with the university.” Another respondent said, “We were part of a job fair in a reputed university and every year we participate in their activities.”
Another respondent said, “There is a difference between academia and industry, currently we are not associated with any university but we can revise our policy if there is a good opportunity.”

**Decision:** Majority of the firms have a policy for link with academia. Firms are interested for liaison but they have a few reservations. Firms are currently engaging themselves with universities like to participate in job fairs, provide internship opportunities, recruit directly from universities, run research centers with university collaboration, etc. but still there are many other options are available to enhance this relationship. Academia and industry join efforts can remove their barriers.

**3. Does your firm have policies to focus on research base activities?**

Most firms prepare their policy for research based activities through universities or R&D department. Firms prefer their own research labs, but for that they have to pay costs. An alternative is available in the form of university collaboration. One of the respondents said, “Yes, after collaboration the students will contribute their knowledge and our access to university graduate and researcher. This agreement will transform the way we work with university into a more structured and strategically aligned engagement. While the initial scope of work is with the Faculty of Civil Engineering and Geosciences.” Another respondent said, “These key research-based strategies have an impact on students as an instructional strategy, it includes various activities that help learners and Practice.”

**Decision:** The firms are interested to focus on research based activities with the collaboration of different universities. They have high expectations of university faculty and students for improvement and innovation through research.
4. **How does your firm cooperate with academia on research, innovation and technology transfer?**

It is very important to ask for the firm's representative about the collaboration process. One of the respondents said, "No, Our organization did not team up with Universities on knowledge and research, innovation and advancement exchange, they have their own area of expertise which have seasoned/qualified individuals in research/R&D side. “Another respondent said, “Doing agreement with universities by regular visits. We are signing a MoU with university to develop long term relationship. There are few barriers with we are trying to remove.”

**Decision:** Joint effort amongst the scholarly community and industry is progressively a basic segment of proficient national development frameworks. Few firms are working in collaboration and joint research, sharing technology and innovation of products. Firms are facing greater barriers to such alliances and collaboration.

5. **How do some factors like universities and governments institutes and other relevant departments, support of businesspersons to decrease their reliance from international Institutions?**

In Pakistan few firms hire international consultancy for the innovation and development of products. One of the respondents said, “Student final thesis should be based on the current situation and problem solution of our Pakistani Companies in which university student took the actual data from company management.” Another respondent said, “We are not depending of international institution for research or any other activity.”
**Decision:** If faculty and students show their commitment to resolve the firearms issue by collecting actual data from the firm and conducting applied research, then firms can focus on consultancy from local universities or government institutions.

6. **How does Pakistan become the regional new manufacture products base industry and support their firms?**

Different sectors of Pakistan have potential of competition from Asian countries. We have intellectuals, experts and genius professionals in Pakistan, our industry can boost if we pay attention toward development. The Textile industry in Pakistan is the largest manufacturing industry in Pakistan. One of the respondents said, “If the Pakistani Government facilitate regarding (Tax Free, Friendly Environment, Relax in duties).” Another respondent said, “Pakistan oil field is open to all international companies, Government law is ease and encouraging investors and joint venturing, merging and acquisitions of different companies, local and international companies.”

**Decision:** the government of Pakistan should focus on industries and relax them in tax, and duties. The industries should focus on collaboration with government institutes and universities for improvement and solution of the problem. Government should arrange the facilitation cell to enhance the linkages of government institutes globally through knowledge exchange program.
7. How does the currently Pakistani industry and academia collaboration?
If we like to enhance the more cooperation, what should require action to need from different sector like industry, academia, government and other relevent institutes?
Currently cooperation level among industry, universities and government is very low. One of the respondents said, “Government should take a step for every industry to accommodate at least Three Degree Holder in every industry on Internship on regular base.” Another respondent said, “I think the Government should apply more rules for companies to interact with universities and exchange knowledge. Companies should guide the universities to develop their academic programs based on workplace requirements.” Today Pakistani universities are contributing as a big part of making people learn about economic growth and by helping them to learn business dynamics. Universities and industries are contributing, we have to grow in our retail telecommunication, and textile and agriculture sectors make the Pakistan economy better.
Decision: the role of government is very important for the corporation between industry and academia. The government can introduce a plan in which provide the incentives for those firms which collaborate with universities. Firms should dictate and guide the requirements for academic programs based on workplace requirements.

8. How do Pakistani government institutes, academia and other relevant departments desire to build the the pure Pakistani enterprises to become faster partnership with transnational firms more than the present?
Being of the partner of Multinational Corporation the fern image goes up. The research institutes and universities can play a role, but the government is also very important for this task. One of the respondents said, “Multinational firms did not rely on our behavior
(Government, Transfer of money, etc.) if we have changed our behavior, then we can closed with multinational partner and due to this reason all multinational companies have only distribution base in overall Pakistan.” Another respondent said, “In my opinion Government should encourage joint venturing and merging companies with similar products and services, mean local companies with international companies.”

**Decision:** The government institutes and universities can play a role, but the government is also very important for this task. Multinational firms like to invest in Pakistan because business opportunities are high, but they are reluctant to government uncertainty.

**4.1.2 Interview Plan for government Institutes and Research institution or Government and other relevent organization profile:**

**Research and Technology transfer process**

1) What is the position of your institution?

From government officials, we asked questions about current research and technology transfer process in their institution. One of the respondents said,” I do not know the position of our organization exactly, but higher education work according to Policy of government to enhance the research base higher education in the country. Higher education is placed in an admirable position to develop the research base knowledge through policy as well as financial assistance.” Another respondent said, “The basic functions of our organization is to make recruitment on behalf of federal government and we may safely say that it is playing a role of leader in the current market scenario.”

**Decision:** In Pakistan Higher education commission is working according to the government policies and is trying to enhance the higher education capability according to
local demand. Research and technology transfer process is currently in developing phase, government is paying focus toward it, but level of focus should be high level.

2) How organize your organization to engage with research activities and a formal collaboration with the Corporate sector?

When we got some information about foundation's research and work collaborating with the organizations, one of the respondents said, “We provided the funds to government research institutions and Universities. Our institution gives Funding motivating forces work as per government approach, should compensate, or if nothing else, not demoralize, Universities and organizations that shape solid associations. New government program, for example, proposed by higher education commission and any other government organization should tempt others to make a similar stride. Presently we have not directly collaborated with the firms.” Another respondent said, “Well generally speaking, just like other public sector organizations in Pakistan, the research work of my organization is not congruent with firms (industry). So far, neither educational institutions, nor industry (firms) could develop a mutual research environment in Pakistan. The reason I see, it is the lack of understanding of the importance of research both in varsities and firms.” Another respondent said, “Our research helps the education sector to device new educational policies and bring reforms in education sector accordingly since we are dealing with the younger generation and their new thoughts therefore the latest trends are incorporated in our research findings.”

Decision: Higher education commission of Pakistan is providing funds for research and establishment relationship between industry and academia but not directly involved. For
close relationship the universities have to device new educational policies and bring reforms for a strong relationship.

3) How to create your organization a entrepreneurial cultural environment to support the industrial cluster or any form of business firms?

For the development of an entrepreneurial culture through the support of industry or firms the institutes play a very important role. One of the respondents said, “The industrial development world over is because of the universities’ dynamic part in creating business visionaries, producing thoughts and exchanging these thoughts to the enterprises and people for the advancement of business. By creating business visionaries, Universities serve the general public by making people independently employed and furthermore creating them as occupation makers for others Higher Education Commission is trying to develop the entrepreneur’s culture between firms and Universities.” Another respondent said, “Just like other organizations in Pakistan, my organization is at the initial stage of developing entrepreneurial culture to support firms. However, through different degree programs such as MBA (Master of Business administration), Engineering, and computer sciences my organization is shaping entrepreneurial skills in students, which I expect would one day lead to entrepreneurial culture development. This move would ultimately help our industry toward competitiveness.”

**Decision:** HEC (Higher education commission) of Pakistan is trying to develop the entrepreneur’s culture between firms and Universities. Through different degree
programs such as MBA, Engineering, and computer sciences, we can develop an entrepreneurial culture to support the industry.

4) Does your organization run any programs to support the graduates students of university or provide any assistante to launching new enterprises?

The part of government and research associations are extremely crucial to help the new ventures. One of the respondents stated, "HEC build the foundation of Business Incubation Center's (BIC) in public sector universities to give essential framework and create allied offices for researchers and young business visionaries who are keen on growing infant business ventures. A business hatchery's fundamental objective is to deliver fruitful firms that will leave the program monetarily feasible and independent. Business Incubators are organizations which bolster new businesses in their early advancement by giving a variety of focused assets and administrations.” Another respondent said, “Formally no such programs exist in my organization. Yet, some teachers individually and informally guide their students in developing small size businesses and enterprises. Usually, such programs are non-existent in almost all public sector varsities in Pakistan.” Another respondent said, “Not applicable in our organization because whoever qualifies for the post and came on merit is appointed.”

**Decision:** HEC (Higher education commission) supports the establishment of Business Incubation Centre's (BIC) in public sector universities to provide basic infrastructure to support the graduates for new companies but the private sector is not playing a vital role in this segment.
5) Does your institution use any kind of process to connect between industry to the graduate students of the local university?

For the joint effort of industry and the scholarly academic community, the part of government is essential. One of the respondents said, “Higher education commissions develop the ORIC program for linkages of Universities and firms connection among the graduates. ORIC (Office of Research, Innovation and Commercialization) and business incubators which connect to the network of the Research Park, each designed to help faculty, graduates, entrepreneurs and businesses to move innovative research to the marketplace.” Another respondent said, “Well my organization has industry liaison cells which is run by a coordinator. However, its full potential has not been realized so far. Usually teachers use their personal contacts to link their graduates with industry. In addition, through internship programs our graduates get linked with industry.” Another respondent said, “Different seminars and such other events are held by our organization on a regular basis to introduce graduates of different universities with the vacant positions and how to compete for these posts.”

**Decision:** Different organizations are using different techniques for linkage. ORIC and business incubators are used by public universities, few of them are using industrial liaison department. Different seminars and such other events are held by many organizations.

6) Does your organization provide any assistance or to develop research innovation and science park for enhancing the collaboration between academia and industry?
For the improvement of academia and industry linkages the establishment of Science Park is also very important. One of the respondents said, “Our institution has been planned the policy to establish the science park with the collaboration of provincial government. Presently, Higher education commission is developing the network among University and industry through incubation of business units /ORIC (Office of Research, Innovation and Commercialization).” Another respondent said, “Frankly, I have no idea of it. Since, it’s a public sector organization; I can suppose it is funded by Government agencies such as HEC.” Another respondent said, “A prescribed procedure has been designed for allocation of funds to our organization i.e. funds are allocated by the federal government in the annual budget plan after rigorous discussion in national assembly as well as Senate of Pakistan.”

Decision: Many organizations have planned for science Park but still under consideration and development phase. The only Punjab government takes the practical initiative to build the Arfa Kareem IT tower and science knowledge park in Lahore, Pakistan.

7) Is currently your organization running any studentship or stipend base programs with the business firms?

Since the foundation of solid connection amongst the industry and the scholarly world, the internship program is a decent open door. One of the respondents stated, "Prime Minister’s Youth Program is a progressive program for the financial advancement of youth, in an offer to battle against taking off joblessness in the nation. It has wide canvas of plans went for empowering youth and poor fragments of the populace to get great work openings, secure financial strengthening, obtain aptitudes and skills required for
profitable business, to upgrade access to advanced level of education and IT devices, benefit at work training/internship job for young graduates.” Another respondent said, “Yes it does to some extent, you may think so.”

**Decision:** Prime Minister's Youth Program and Punjab government internship programs are a way for interaction between academia and industry. Internship program helps to interact the industry and academia.

8) Have your organization running a practical and technical skill base training programs with collaboration of the industry?

Another option for the promotion of linkage joint training off/on the job for university graduates. One of the respondents said, “HEC plans to build up a culture of research and learning, sharing between Higher Education Institutions, and additionally well-established linkages with pertinent modern industry and the corporate world.”

Other respondents said, “Fresh graduated are offered opportunities to have an internship in our organization to polish their skills and become a useful asset of industry.”

**Decision:** HEC (Higher education commission) intends to develop a culture of research and knowledge sharing by offering a link within academia and industry. Fresh graduated are offered opportunities to have internship in different organization to polish their skills and become a useful asset of industry.

9) Have your organization a consultancy practices to the business firms?

If yes, how?
Good researchers and scholars can provide consultancy to industry for their developments and promotion, if this facility is provided via linkage of industry and academia. One of the respondents said, “The HEC (Higher education commission) underpins the business and the scholarly community to give essential consultancy and allied facilities for scientists and young business people up to some degree who are keen on growing infant or premature business ventures.”

**Decision:** HEC is providing this facility up to some extent.

10) Does your institution engage with business development services to upgrade the industry according to international pace?

For the support of industry, establishment of incubation services throughout the country is very important. One of the respondents said, “It is a key challenge to develop a support system with industry. The higher education commission is very much aware of this issue and resolved to help the business through hatching services.” Another respondent said, “No we have not started such services.”

**Decision:** HEC (Higher education commission) is well aware of this issue and committed to support the industry through incubation services but many other organizations do not have this facility.

11) Does any mechanism exist for implementation of research projects?

Many researchers complete their research during their academic process, but is there any mechanism exist for the implementation of these projects? One of the respondents said, “HEC (Higher education commission) will ensure the formulation of mechanism to
follow up with the industry. HEC is encouraging institutions and industry to connect this hole and investigate every single potential territory that would outfit financial advancement and success for future eras of the nation. Universities should set up Corporate Advisory Council (CACs) where major sectors of industry have full participation in finding opportunities of joint academia, industry linkage, but unfortunately currently this relationship does not exist.” Another respondent said, “No, currently this mechanism is not existing.”

**Decision:** HEC (Higher education commission) will ensure the formulation of mechanism to follow up with the industry. HEC is facilitating universities and industry to bridge this gap. Universities should set up Corporate Advisory Council (CACs) where major sectors of industry have full participation in finding opportunities of joint academia industry linkage

12) How does government institution work to provide the proper policy direction on collaboration with academia and business firms? If Yes, what is the strategy? And what is major effect on this cooperation?

Role of the government is very important for the promotion of industry academia relationship. One of the respondents said, “The Higher education area is quickly creating a field in Pakistan. Musharraf government in the mid-2000s, demonstrated an unmistakable strategy to enhancing advanced education, as substantiated by imperative lift in consumption on advanced education, not long after the initiation of the Higher Education Commission (HEC) in 2002. Financial development rate will be essential expanding in next 20 years. To adapt to this consistently developing world we should
upgrade connection amongst Universities and industry through information and aptitude and skills. This requires profoundly prepared organizations and talented staff and experts and for this we need to put resources into advanced education. It is expressed in the Sharif Commission Report (1959) that the Vice Chancellor (VC) ought to be responsible to the Chancellor for the equitable and the legitimate execution of his capacities. The VC will be the chief academic and administrative office of the institution. A lethal issue here is that the Chancellor, who should consider the Vice Chancellor responsible, has neither the time nor the mastery for this errand.” Another respondent said, “Apparently, No. Government is not serious playing role for the establishment of this linkage.” Another respondent said, “This is not the responsibility of government, the industries and universities should think about this linkage.”

**Decision:** The government is not taking steps to determine the directions and policies for industry-academia linkage.

13) What is role of government institutions to help the business firms to enhance firm’s growth and make a sustainable competitive environment for the industry?

There are many government institutions in the country and HEC (Higher education commission) also recommends to all universities for the establishment of ORIC office. One of the respondents said, "An idea of competitiveness in this manner includes static and dynamic segments, it will be conceivable with the help of research foundations. Despite the fact that the efficiency of a nation decides its capacity to manage a high increment of research and training, it is additionally one of the focal determinants of its arrival on venture, which is one of the key elements clarifying an economy's development
potential and competitors. In Pakistan, this role is limited. At least role seen in industry and research.” other respondents said, “university teachers and students are usually in touch with the latest research and developments taking place globally, they can provide useful and current input to the industry, which can help industry in attaining competitiveness and sustainability.”

**Decision:** In Pakistan, this role is limited. At least role seen in industry and research. University teachers and students are usually in touch with the latest research and developments taking place globally.

14) Does any collaboration model exist or work beteween academia-industry and government institution? (Industrial cluster role, public departmens / institution and academia role)

For the establishment of industry, academia and government linkages which mole are more suitable? One of the respondents said, “A particular qualities of logical learning, R&D participation amongst Universities and industry is described by high instability, high data asymmetries between accomplices, high exchange costs for information trade, requiring the nearness of absorptive limit, high overflows to other market performing artists (i.e. A low level of apportionment of advantages out of the learning gained), and, limitations for financing information generation and trade exercises because of hazard disinclined monetary markets. Furthermore, upholding compliance consistence in helpful contracts will be more troublesome when the innovation is portrayed by a lot of instability. By and by, the more the nonexclusive nature of research ventures with Universities and research organizations includes less protected innovation right issues are
like. I take note of that when research outcomes are dubious, the two partners can characterize important limits for any subsequent Intellectual Property, and consequent allocation is more averse to be issue. I have not found cooperation among government institutions, University and Industry. Higher education commission committed to develop the mechanism between University-Industry and Government.” Another respondent said, “Well, practically speaking, firms should engage university teachers and students in conducting research projects on different ideas and should provide grants to universities. Similarly, universities should conduct researches based on the ideas provided to the firms. I suppose this it’s the proper and practical need to mechanism model of building cooperation between the university and the firms.”

**Decision:** Many respondents said we have not found cooperation among government institutions, University and Industry. However, firms should engage university teachers and students in conducting research projects on different ideas and should provide grants to universities. Similarly, universities should conduct researches based on the ideas provided to the firms.

4.1.3 Interview Plan for Universities

**Role of Academia /Universities:**

1) **How does academia directly engage with the industry?**

Universities are one of those institutions which play major role in the development of contemporary societies through education by imparting knowledge to the general masses. Different respondents indicate the directions and role of university involvement in the industry, one of the respondents said, “There are plenty of opportunities at your disposal which undoubtedly are creating links through patronizing and licensing different
inventions along with academic entrepreneurship.” The coordinated effort amongst Universities and Organizations would help young researchers and trend-setters to enroll their researched items immediately and profit the chances of cutting edge learning and research-based considerations.” Another respondent said "Universities assumes a vital part in specialized limit working for Pakistan's industry, by encouraging its collaboration with Universities scientists who can give the essential equipment, look into reinforcement, and esteem expansion to refined products through advancement. After the introduction of innovate products then we can attract industry.” Numerous others factors were featured by different respondents e.g. involvement of faculty, involvement of students in different research projects, joint research collaboration between universities and industry, fabricate a managerial and subsidizing system that is natural to faculty etc.

**Decision:** In Pakistan universities is not paying attention toward directly involved in the industry by using different methods. Universities must pay attention toward directly involved of faculty and students with industry. Universities take steps towards collaboration with industry by the involvement of graduates. The majority of the respondents are agreed that the universities must take initiative for relationship with different firms.

2) **How does the Academia support to transfer of knowledge after proper research and innovations?**

Learning exchange is a more extensive idea than innovation exchange: it incorporates other exchange channels, for example, versatility of staff or research publications. Different respondents indicate the directions and the role of universities to promote the research and knowledge transfer, one of the respondents said, “In our University,
Effective knowledge transfer channel is needed to develop the strong mechanism. Recently not in an ideal stage to promote the knowledge in Pakistani Universities.” Another respondent said "Knowledge Transfer comprises of the scope of exercises which intend to catch and transmit information (either explicit, such as in patents), abilities and competence of the individuals who create them to the individuals who will change them into monetary results. It incorporates both business and non-business activities, for example, look into coordinated efforts, consultancy, authorizing, turn off creation, researcher versatility and publication." Many other respondents’ highlighted further points like the university promotes result and knowledge transfer through students/teacher exchange program, participation and organization of conferences enhance this collaboration approach, commercialization of scholarly information, including the protecting and authorizing of inventions and in addition academic entrepreneurship and so on.

**Decision:** There is a need of promotion of knowledge transfer with firms. Unfortunately, currently are lacking this point, they are not sharing their faculty or students with firms to get the practical knowledge. The universities must organize the different events with the collaboration of industry.

3) **How does entrepreneurial values and culture of business firms involve to link the academia?**

It is critical for Universities to straightforwardly indulge in the research to support the industry, one of the respondents said; "there should have been sensible of duty regarding executing the system in connection to the entrepreneurial plan. To score very, the methodology ought to be referred to the higher authorities and comprehended as a need
by staff and understudies. The dedication ought to be shared and bolstered by inward correspondence endeavors. Another key point of responsibility is whether somebody on the level of the Dean or Rector is made in charge of the entrepreneurial agenda. Universities with solid duty at high level return to and modify techniques to stay up with the latest." Another respondent said; "Universities may likewise have adjusted their structures to better convey the entrepreneurial system. One way that Universities can add to the enterprise is through direct research. Frequently, University research is thought about as being directed by educators for the advantage of teachers and scholars. Be that as it may, numerous Universities research labs are fit for creating and leading research in the interest of new companies. This can be indispensably vital for the new business (e.g., implementation of a new software algorithm or design and packaging of a new computer chip, new business ideas)." Many different respondents imparted their insights in various ways e.g. Universities must offer reward frameworks for specialists on new thoughts, advancement and creativities, some budgetary motivating forces may apply, many staff stays hesitant to participate in such exercises, particularly as they are not considered for vocation development. The University research projects are about advancing the entrepreneurial culture of industry through research ventures/gifts and logical labor trade.

**Decision:** The universities have the option of research by using this tool universities can support the industry. But for this collaboration the universities must pay attention to its faculty and students, which will be the source of this collaboration. The universities offer different rewards and incentives for faculty and students to promote their research and conduct research specifically for the industry.
4) How does you rate the unique features of academia and higher education institution regarded by business firms/industrial units

Distinctive respondents show the uncommon components of University exceedingly respected by industry, one of the respondents stated, “An expanding number of doctoral understudies cooperate with firms, however we know generally minimal about the encounters of these under studies or how coordinated effort impacts their training, research and ensuing professions.” Another respondent said, “The quality of produced graduates is a special feature which is highly recognized by industry.”

Decision: The universities can increase their linkage with industry with special focus on its doctoral and postgraduate students. If during the study students creates good relationship with industry, then after the study they can join such organization.

Research and Technology transfer process

5) What are the academia’s/University spin-offs? How does it work?

University spin-offs have not amazingly reinforced the linkages amongst Universities and industry. One of the respondents stated, "The quantity of technology patents and spin-off from University research has not critical effect on provincial financial and social advancement. To additionally feature the significance of University spin-off, the point is to review accessible literature on University spin-offs and show exhaustive reviews of what University spin-offs are, the reason they are imperative, what makes them critical, and how they are or can be made?" Another respondent said, “University research
normally based on market demands and trends as the markets demands change the paradigm shift and the trends lead to the same so it is very important.”

**Decision:** Presents of University spin-off, from which we can close the vital components of their spinoff are advancing, valuable output, exploit knowledge and technology patents. The faculty should take a review of previous work on the spin-off and present a comprehensive overview. The universities should conduct research on current and future market demand of industry.

6) **What types of measure initiate the academia to develop the business and culture to establish the new firms?**

In Pakistan the most vital for the Universities is the training of the youth and it's through specialization in different fields of action. The objectives of the University toward this path are: support the cross-fringe monetary advancement process by expanding the measure of business people, there is need to build up new companies’ cross-border; to redesign HR by upgrading the quantity of start-up business visionaries’ cross-fringe with practical strategies for success and preparing local trainers. One of the respondents stated, "Advanced education organizations ought to have a methodology or activity for instructing and research in business enterprise, and for new venture creation and turn offs. This requires the improvement of an "Entrepreneurial University", a noteworthy change in the way of life of advanced education organization.” Other respondents said, it can teach potential business people by exchanging more ordered learning into marketing, regulatory, monetary, innovative and different zones. University provides the students an
environment on cultural days, during different seminars and different gathering organized by the student unions under the umbrella of Student advisor department, few universities to show off their entrepreneurial skills on small levels afterwards the small and small things will boast up the mind set in the form of market leader of future.

**Decision:** The universities should prepare a strategy for the development of entrepreneurship activities and create ventures within country. The universities should conduct seminars, workshops and different events with the collaboration of industry to promote and increase the relationship between these two sectors.

7) **Does your University have a studentship or graduat students initiative to create a new enterprises with the support of university?**

Universities frequent claims to priorities the creation of work that is ready for the graduates so they can behold that opportunity, with less effect on what they actually impart to students.

One of the respondents said, “Our university jump up a global ranking for employability as they are managed to conduct job fair on time to time basis this may suggest that its own efforts are having a significant effect.” Another respondent said, “At the moment there is no such program. However, ORIC (Office of Research, Innovation & Commercialization) of university is launching to establish such a program. There is no program in our universities to support the student to develop the entrepreneur’s environment, it is ignoring side and need to support the business students.”
**Decision:** Yes, universities have plans to support the young graduates for development of new ventures in the country, but majority universities are not paying attention to this issue. Universities organize job fairs to promote the job attitude of graduates, but same such activity universities have to organize an activity for the creation of new ventures in Pakistan. ORIC have plans to organize such plan, but unfortunately they are still ignoring.

8) **How does academia use the courses of linkage with research students / scholars and industry?**

It is imperative for Universities find a way to associate amongst firms and the graduates. One of the respondents stated, Universities participate with a official way of contacts with professors and graduates. Business firms initiate the consultancy service with collaboration of academic and industrial experts. Some times academia develop provisional and contracts position with students on science, research and innovation.

Be that as it may, “There are a least linkage found during instrumental testing with perspective of Ph.D students research achievements, public funding issues for student research projects for business development, financial supporting regarding science and research activities for students and hatching administrations”. Another respondent said, “Normally the Alumni section for the university is performing such kind of process the alumni already serving in different organization float the ads through the office of student advisor along with the different social media may also be used for establishing connection.”
**Decision:** University can use different measures to connect graduates and firms e.g. contract a sign with few firms for internships, free consultancy for their problems, on-job training, etc. The alumni can also play a vital role to connect industry and academia.

9) **Where is the university’s research financing allocated from?**

Many universities receive funds from higher education commission for ORIC and it is their responsibility to it with researchers. One of the respondents said, “As university student it is often very difficult to finance research work as it required a lot of wealth at present most of trivial research has been self-finance. Whereas with forgoing events up to some extent government of Pakistan is directly or indirectly is in authority for financing the research work in Pakistan.” Another respondent said, “One of the main challenges identified was the lack of funds required to expand research opportunities.”

**Decision:** Currently universities are not providing the finance to researcher for research activities, trainings, travelling etc. then how they can polish their self. For a graduate student who is not doing a job it is difficult to manage from his/her research expenses.

10) **Does your University have any initiative to develop the research and science park to promote the academia and business firms linkages?**

Firms expect advantage from coordinated effort with Universities in human asset improvement and innovation/designing procedure advancement. One of the respondents
said, “Not actually in the same sense but lab have been oriented in different department of the faculty where the university student gets hand on experience over in-house development that leads to professional experience under the qualified lab engineers.” University-industry joint effort can likewise grow the importance of research did in broad daylight in public Institutions, cultivate the commercialization of open R&D results, and increment the versatility of work force amongst open and private sectors.

**Decision:** No, universities are currently not working on such project. Establishment of Science Park is a great opportunity for industry and academia, both can easily attract each other.

11) **Presently , your University have a placement program with industry or willing to develop a mechanism in future ?**

The activity of internship programs with the cooperation of industry is vital. Such program helps youthful graduates for their professional career. One of the respondents stated, "Universities suppositions are that the government assumes a dynamic part in clearing up national heading and arrangement to help the collaboration, passing out research students. Who are significant to demand of business firms and elevating academics programs to progressively bolster the organizations; though some of business firms don't concur to this stance.” Another respondent said, “A few firms' assessments are that the government assumes a dynamic part illuminating national direction and arrangement to help the collaboration, producing graduates." Another respondent said, “Currently University students from different academic program like students from media
department sociology department and statistics department are getting training under internship program under MoU made under universities and different organizations further university itself is an industry facilitating students of different domain to do internship within university different departments.” With the foregoing events such as recent job fair can be conducted by university in collaboration with many of renowned brands and employers it can be concluded that university may have the sources of relevant channels in the surroundings

or at national or international level that they have bilateral relation with such industry who generate internship program for fresh graduates.

Decision: Few universities have signed MoU with firms for internships and other opportunities. Government can play an important role in the reduction of the gap between industry and academia. Government can insist the public and private sector for placement of fresh graduates as an internee and then for jobs.

12) Does your university work any type of skill and training programs with the collaboration of industry?

Firms require Universities' help through building / research and innovation science parks, consultancy services, trade of learning skill and innovation specialists and designing / business specialists.

One of the respondents said, “As it has been already discussing before that the recent events which are organized by the university in collaboration with some of well renowned employers they may have skilled training joint venture with the industry.” Another respondent said, “Yes, University have the department of IPD (Institute of
Professional Development) where the versatile master trainer trained the human resource working in the university, along with the multiple training session from the Secretariat Training Institute Pakistan (STI) are really helpful in the growth of official in upgrading their administrative skills.”

Decision: Institute of Professional Development department should be active to manage skilled-training from industry experts. University and industry well known trainers should be exchanged on a regular basis to share their knowledge and experiences with each other.

13) Does you ensure currently the university have service of consultancy with the corporate sector?

If yes, how?

In term of supporting the business' aggressiveness and manageability, Universities need to progressively create graduates who are significant to the business’ need, bolster human asset improvement/preparing program, lead engineering consultancy and upgrade University firm collaboration for innovative critical thinking. One of the respondents said, “It have the consultancy with the industry as the job fair is conducted, most of the employers are looking for individual who are virtuous in marketing so they choose the Management Sciences department for their discoveries, this relates that they already consult with the university and conveys their requirement. So based on this university conducted the job fair in management sciences department in order to align the interest of employee and employer.” The opportunities for consultancy have been explored in the recent past and will be a feature in near future.
Decision: Currently universities are not getting any consultancy to produce graduates as per requirements of industry which is a very important factor.

14) Have University run any business development program to facilitate the corporate sector?

Brooding administrations to help the business is vital for industry-academic world linkage. One of the respondents stated, "Firms propose the four sorts of communitarian association with academic sector . There are joint efforts of business firms straight forwardly with academia : 1) University research for innovative business ideas , 2) Master skill exchange programs among the business units and academia , and 3) Investigate / inventive budgetary help to grow new innovation. The fourth, back-handed model is that the organizations team up with Institution of higher education over the Pakistani ventures and chamber of commerce, which go about as partners between industry and academia by gathering normal issues of business units and urging Institution of higher education need to found the answers on this . For a few business units, which don't team up with Universities recommend an approach to fabricate joint effort later on, in particular access to instructional / training classes, temporary job/placement of students in science and innovation, individual contact with scholarly educational center and research participation for valuable diverse advancements.” Another respondent said, “The ORIC is planning to establish an incubation services in near future.”

Decision: ORIC (Office of Research Innovation and Commercialization) is planning to establish an incubation center in different public sector universities but
it will take time. Therefore, private universities should take steps toward such centers, which will be helpful for industry and academia.

4.2 Industry, Academia and Government Seminars

Academia linkage with industry is the most important factor of economic growth of any country because challenges which an economy faces in the future will be the responsibility of the current students. This linkage is helpful for the students to invent the new business models to overcome the problems which an economy faces the future.

At Lahore chamber of commerce and industry (LCCI) a seminar was arranged where Executive Director of Higher Education Commission Dr. Arshad Ali, LCCI President Abdul Basit, Senior Vice President Amjad Ali Jawa Former President Engineer Sohail Lashari, PEC chairman Javeed Saleem Qureshi, chancellors and representative of fifteen different university shares their views and opinion on this seminar about the linkage of academia-industry linkage.

Dr. Arshad address was about the development of the strategy which can provide the benefit of academic research to the industry. According to him there were 67 universities in 2002 when HEC was established and at that time budget was Rs. 6 billion for about 0.7 million students, but now we have a very different situation because now a days 183 universities providing services to approximately 3 Million students. Now it’s time to set up an action plan which provides helpful linkage in academic research and studies and industry. He also said that HEC is working on this weak linkage and they are committed to creating a strong relationship between industry and academics and soon they will fill
this gap and will find more potential areas which will be helpful for the economic development for the future generation of the country and which can improve the academia-industry linkage.

President of LCCI (Lahore Chamber Of Commerce and Industry) in his address said LCCI is very serious to resolve weak linkage problem and has declared 2017 as an academia industry linkage year. Actually objective of LCCI is to get maximum benefit directly from the research conducted in the universities. According to him strong linkage will decrease the cost of doing business, increase the employment opportunities in the country and industry can get the competitive advantages. Mr. Basit said research according to the demand of the industry will give benefit to both parties. The researcher can get a reasonable price from the industry for their research work and industry can get new research information at a low price without any extra work and time. Vice President of LCCI said to resolve the problem of brain drain linkage between industry and educational organization should be very strong. He also said a standing committee has been formed by the LCCI to enhance the liaison between Industry and universities. Mr. Sohail Lashari, former president of LCCI said if universities want to full fill the demand of the skilled labor, then they should understand the needs of the industry, and to create thins understanding the linkage between these two sectors is very important. PEC Chairman said reverse engineering help to get knowledge and to reproduce any product, so in research institute industry representation is necessary and more homework in this regard is required.
Main points

1. Dr. Arshad address was about the development of the strategy which can provide the benefit of academic research to the industry.

2. President of LCCI in his address said LCCI is very serious to resolve weak linkage problem and has declared 2017 as an academia industry linkage year.

3. Strong linkage will decrease the cost of doing business, increase the employment opportunities in the country and industry can get the competitive advantages.

4. The researcher can get a reasonable price from the industry for their research work and industry can get new research information at a low price without any extra work and time.

A seminar was arranged by the HEC (Higher education commission) about the academia-industry linkages in July-August 2015. Another partner of this seminar was Institute of Space Technology, University of Gujrat, Pakistan. The basic aim of this symposium was to provide a platform for both parties so that they can develop a policy and strategy for the use of academic research in the industry. This will transform the Pakistani environment into the knowledge-based environment. Many well-known personalities including government officials, industrialists, chancellor and vice chancellors of the different universities expressed their views in this symposium.

Federal minister for planning, Development and reform, Mr. Ahsan Iqbal said “The government cannot achieve its intended economic targets unless all sections of the society play their defined roles and that the contribution of academicians and researchers is of paramount importance.” Federal Minister also said combine effort of all the units of Pakistani society will bring the prosperity and development in the country.
He advised the university to integrate the student research with the industrial requirement so that industry can get the benefit from this research and students can explore a new area of research. Exposing the ongoing projects to students and researchers will provide hands on experience. Federal Minister also explains the importance of entrepreneurship and its significant impact on the economic growth.

Dr. Mukhtar Ahmed, chairman of HEC (Higher Education Commission) said HEC is now taking all the necessary steps to provide a bridge to research institutions and industry so that research can give direction to their research toward the industrial requirement which will provide the sustainable economic growth and future knowledge economy. To achieve this target HEC is now providing facilities and also motivating the students to do industrial base research. He was hopeful for the successful impact of the symposium and it will promote and increase the knowledge sharing between the educational institutes and industry.

Dr. Tariq Mahmood adviser R&D, HEC (Higher Education Commission) said that this symposium is to motivate the academia and industry to develop innovative products by utilizing and promoting the state-of-the-art technologies and ideas to enhance the Pakistan’s technological revolutionary process and we can create our image in front of the international community as a nation which is rich in the development of state of the art products, skilled labor and technologically advanced man power. Chairman of Rastgar Engineering Company (Pvt) Ltd Mr. Rasgar also addressed and said that upcoming challenges which our society and economy has to face can be resolved when there is a strong linkage between the academia and industry. Through this linkage students and researcher will get the information about the needs of the industry and then they can
update their curricula as well as conduct research in those areas which are creating disturbance in economic development.

**Main Point**

1. The aim of this symposium was to provide a platform for both parties so that they can develop a policy and strategy for the use of academic research in the industry.

2. Mr. Ahsan Iqbal advised the university to integrate the student research with the industrial requirement so that industry can get the benefit from this research and students can explore a new area of research

3. Dr. Mukhtar Ahmed, chairman of HEC said directing the research towards the industrial requirement will increase the economic growth of the country.

4. Rastgar Engineering Company (Pvt) Ltd Mr. Rasgar also addressed and said that upcoming challenges which our society and economy has to face can be resolved when there is a strong linkage between the academia and industry.


A seminar tittle bridging the Education-Practice Divide held by the UET (University of Engineering and Technology) Lahore, Prof. James Trevelyan from University of Western Australia said “The gap between education and Practice can be narrowed by linking up academia and industry”

He also highlighted the research importance and awareness about the new trends in the field of engineering and technology. “In order to become a successful engineer, one must monitor the trends of the modern world. One must learn about engineering inventions and innovations to get a prominent place in the market,”
According to UET (University of Engineering and Technology) vice chancellor Mr. Fazal Ahmed Khalid the basic purpose or objective of establishing the engineering institute is to create a linkage between the academia and industry. In his speech he said “The UET (University of Engineering and Technology) Lahore is establishing strong relations with various firms to provide industrial exposure to future engineers. The UET recently held an industrial open house and a career fair to bring academia and industry under one umbrella. This sort of approach will be beneficial for both academia and industry,”

Mr. Zulfiqar Ahmed Cheema Executive Director of National Vocational and Technical Training Commission (NAVTTC) explained the importance of technical education, according to Mr. Zulfiqar unemployment can be reduced by providing the technical education to the society. Skilled labor is the key requirement for every country.

Main Points

1. UET vice chancellor Mr. Fazal Ahmed Khalid said The UET Lahore is establishing strong relations with various firms to provide industrial exposure to future engineers.

2. Mr. Zulfiqar said unemployment can be reduced by providing the technical education to the society. Skilled labor is the key requirement for every country.

One day seminar on industry-academia relationship was conducted by PPEPCA (Pakistan Petroleum Exploration & Production Companies Association) NED University of Engineering & Technology May 29, 2013. MD KUFPEC (Kuwait Foreign Petroleum Exploration Company) Mr. Shahid Salim Khan said universities can produce the best output, but updating the syllabi according to the requirement of the market. Opportunities to visit industry should be given to the faculty member to update knowledge and understand the current market demands. This will also create the awareness of the
industrial working environment among the faculty member and students. This academia, industry collaboration tree will produce the fruit within the few years.

Lt. Gen. Raza Muhammad Khan (Retd.), the President PPECA (Pakistan Petroleum Exploration & Production Companies Association) Expert Committee welcomed the delegates of the different universities and other. He said the road map of industry, academia linkage should be clear to get the effect result of this collaboration. Prof. Dr. M.A Afzal Haque, Vice chancellor of NED University delivered the Inaugural Address and thanked the PPEPCA for their selection of NED University for conducting Symposium on “Industry academia collaboration” In his speech he said that the energy scenario of Pakistan required very strong relationship between industry and academia to develop a healthy technological base economic development. Optimization of production and effective & efficient management of the available resource is the only way for Pakistan to come out from the energy crises, and to achieve this objective that industry required professionals with the required skilled and up to date knowledge. He also expresses his hope that both parties will get the successful result of this symposium and participant will set the goal of strengthening the linkage between the industry and academia and this linkage will help to develop both the industries which ultimately improve the development of the country. The vice Chancellor also advises the universities that energy crises of the country required quality engineer.

Main Points

1. Opportunities to visit industry should be given to the faculty member to update knowledge and understand the current market demands.
2. The energy scenario of Pakistan required very strong relationship between industry and academia to develop a healthy technological base economic development.

3. Optimization of production and effective & efficient management of the available resource is the only way for Pakistan to come out from the energy crises, and to achieve this objective that industry required professionals with the required skilled and up to date knowledge.

Another symposium on Industry-Academia linkage on Water Technologies Research was conducted at Mehran University of Engineering and Technology (MUET) Jamshoro. It was organized by U.S Pakistan Centre of advance studies in Water (USPAS-W) in collaboration of University of Utah. VC of Federation of Pakistan Chamber of Commerce Mr. Waseem Vohra chaired the session of first day. He said in Pakistan consumption of water in agriculture sector is 95% and in GDP contribution of this sector is 20% on the other hand industrial consumption of water is only 2% but contributes 22% in GDP. Industry is paying very big amount for the required volume of water. Mr. Waseem Vohra requested the research institute and students to work on the solution of water problem which industry is facing now a day. Deputy Director (Academia & Research) at USPCAS-W) and the co-chairperson of the 1st session of academia industry symposium Dr. Rasool Bux Mehar in his speech share the goals and objectives of this symposium. In his speech he said that the basic aim behind this workshop was to gather industry academia persons at one plate form where they can share industry academia point of view on technology needs, applications and innovations. He also said that this symposium was arranged to generate different ideas for the industry-academic combine research on water
technologies. This workshop will try to build partnership between the industry and academia on the issues facing by the both entities.

Dr. Zulfiqar Ali Umran, Manager Entrepreneurship and Innovation started the panel discussion in this symposium. His topic was business opportunities related to water and in Pakistan what are its research and development needs. Panel members were Mr. Nazeer Ahmed Memom, GM Sindh Irrigation and Drainage Authority, Dr. Arshad Mehmood from Archroma Pakistan Ltd, Mr. Sirag Nasir Siddiqi from Afghanistan. All members spoke on the current business opportunities and required research to get benefit from these water related business opportunities. In Mr. Siddiqi point of view if academia convinced the government officials and authorities that new technology, research and business opportunities of water can bring change than this could be very helpful for the industry and community. Mr. Nazeer Memon, GM SIDA in his speech shared his observations. According to him in Pakistan government authorities and officials are reluctant to use new technologies. To save water, agricultural sector convinced the landlords to use the new technological equipment. Many of them installed the new equipment, but still they are using old one. The purpose behind the installation of new technological equipment was to get subsidy provided by the government and international development agencies. Dr. Awais Khatri, Faculty Member of Textile Department MUET said in Pakistan 60% of the export is textile based production, but in the world this industry is considered the most polluted industry. According to the World Bank 2015 report 17% to 20% of the world pollution is because of textile industry.

Main Points
1. Mr. Waseem Vohra requested the research institute and students to work on the solution of water problem which industry is facing now a day.
2. Symposium was arranged to generate different ideas for the industry-academic combine research on water technologies.
3. In Mr. Siddiqi point of view if academia convinced the government officials and authorities that new technology, research and business opportunities of water can bring change than this could be very helpful for the industry and community.
4. Many people from agriculture sector are reluctant to use new technology, they just installed the new equipment to get subsidy from the government.

University of Gujrat arranged a symposium titled Distinguished Innovations, Collaboration and Entrepreneurship (DICE 2013) in collaboration with HEC, British Council and Pakistan Council for Science and Technology (PCST) VC of UOG (University of Gujrat) Prof. Dr. Nizamuddin said

“We are a large country with a demographic bulk of young people. It is high time that we address the educational needs of our youth today for our prosperous tomorrow. To achieve this objective, we need to revamp and renovate our educational system, to bring in real life stuff, which addresses our real socio-cultural needs”.

4.3 NVIVO Analysis

4.3.1 University analysis

When university depth interviews were conducted from different respondents of the university, the majority of the respondents are agreed that the universities must take initiative in collaboration with different firms. Universities are not paying attention toward directly involved in the industry by using different linkages. They have shared the
experiences, they emphasis to minimize the challenges as they faced in the universities especially in the public sector. Majority of respondents’ answer was different, everyone highlighted the need of linkages as he/she not presently involved with the industry.

Figure 4.1 NVivo output of university interviews

A person who has practical experiences, he/she can share and give a better opinion. Majority respondents said, there is a need of promotion of research base knowledge transfer with firms. Unfortunately, currently are lacking, they are not engaging their faculty or students with firms to get the practical knowledge. The list of major challenges that were prominent by respondents is given below.

1. Involvement of the universities in the industry can be done by using Research program for faculty and students.

2. Members and young researcher in the industrial project to increase their skills and knowledge and it can also decrease the industrial cost of R&D.

3. In Pakistan universities are not plane towards their involvement in the industry.
4. A knowledge exchange channel is required in the universities which can help the young researcher to interact with the industry directly. Knowledge exchange is always better than technology or innovation exchange.

5. In Pakistan, universities are normally using knowledge exchange techniques between the teacher and students, which is good but limited. To produce good researchers, universities should provide a chance to the young researcher to interact directly with the business firm and relevant industrial units.

6. Universities can contribute their role in economic development of the country by using their labs, young researchers, and faculty members by involving these resources in research processes which are required in the industry.

7. In Pakistan, universities are not offering any financial help to the young researcher for research activities or training. That is why young researchers are not very much interested in the research process.

8. The Skilled Development Department should be active in the universities and starting the internship programs in the industry can also help in the knowledge sharing process.

9. Universities in Pakistan can increase their linkage with the industry by starting different events in collaboration with the firms, this also helps both parties to share their knowledge and experiences.

10. A collaboration of the university with the industry is also required to produce young entrepreneur in the market.

11. Arrangement of the seminars and workshops in the universities with the help of student unions and business organizations working in the local industry can also
help the young entrepreneur to get know how about the business environment and requirements.

4.3.2 Industry analysis

When industry depth interviews were conducted from different respondents of the firms, the majority of the firm manager respondent stated that the must take initiative in collaboration with local universities and government institutions. There is a lacking area between academia and industry. Currently, there are not well associated with any university, but it suggests to revise the policy if there is a good opportunity. Most respondents, they have practical experience of different industries they shared field experience and business problem during the interview session as they faced during dealing with business Majority of respondents’ answer was different, everyone highlighted challenges as he/she observed.

Figure 4.2 NVivo output of industry interviews
A person who has practical experiences, he/she can share and give a better opinion. Majority respondents said a proper mechanism is not maintained in university side as well as government bodies. Instead of highlighting every individual response, the list of major challenges that were prominent by respondents is given below.

1. Pakistani industry is facing taxes and other regulatory problems from **Government** of Pakistan.
2. Currently in Pakistan collaboration among the government, industry and universities is very low.
3. There is no incentive from the government side for those industries who collaborate with the research institutions.
4. If we decrease the government uncertainty problem, then multinational companies can start a merger or joint venture with the local companies of similar products, this policy can help us to update our knowledge.
5. To create a knowledge base industrial environment, industry should guide the universities about their academic outlines.
6. To get the innovative product and consultancy many local industries are getting help from the multinational institutions instead of collaborating with the local research institutions.

4.3.3 **Government analysis**

When depth interview was conducted from different government officials, the majority of interviewees is working on an executive position deal with other institutions and play important role in policy and decision making. During the depth interview, the majority of
respondents stated about the close linkages the government has to device new educational policies and bring reforms for a strong collaboration with university and industry according to global pace.

![Figure 4.3 NVivo output of government interviews](image)

Instead of highlighting every individual response, the list of major challenges that were prominent by respondents is given below.

1. Universities creates visionary **Businessmen**, which are the major factor of industrial development.

2. A university teacher helps and guides their student to develop SME.

3. HEC is providing **Business** incubation center (BIC) in public sector universities, but private sector universities are not playing their role in this regards.

4. In Pakistan Government is trying to enhance the position of Higher education from the traditional to the research base.
5. In Pakistan Higher educations are not properly connected with the required industrial knowledge. To get the benefit universities have to develop new educational policies.

6. HEC should create a bridge between industry and academia for the purpose of knowledge sharing and this can be done by offering off/on job combine training and pre/post internship programs.

7. Organizations have planned to start a science park, but this is still an idea in Pakistan and so far there is no science park in Pakistan.

8. In short, in Pakistan no cooperation is found between research institutions and industry.

4.3.4 Seminars Analysis

When these responses were collected from the different seminars on university, industry and government linkages these responses were perceived by the highest official address to the audience and formal discussion and brainstorming session. Leaders of different industries, institutions, university heads have addressed, mostly speakers, shares their views and opinion on about the linkage of academia-industry linkage. To closely observe and noted the challenges of each sector. Majority of respondents’ opinions were different. These are given;
1. In a seminar Dr. Arshad said that now a day, 183 universities are providing services to approximately three Million students so now it is the time to set up a strategy to link their research and academic program with the industry.

2. According to Mr. Basit research related to the industrial problem will help the industry and researcher too. Researcher will get the reasonable price and industry will get low price information.

3. In Mr Ahsan Iqbal opinion Linkage of the academia and industry is in the benefit of the government because to achieve the economic goal government needs a healthy, innovative industry, and industrial innovations required skilled young students.

4. HEC is now providing facilities and motivating the students to conduct the industrial base research

5. Mr. Waseem Vohra requested the research institute and students to work on the solution of water problem which industry is facing now a day.
6. President of LCCI (Lahore Chamber of commerce) in his address said LCCI is very serious to resolve weak linkage problem and has declared 2017 as an academia industry linkage year. Actually objective of LCCI is to get maximum benefit directly from the research conducted in the universities.

7. Dr. Rasool Bux Mehar in a symposium said that workshops gather industry, academia persons at one platform where they can share industry, academia point of view on technology needs, applications and innovations.

Process Model a demonstration of one or more processes and their links that an organization performs, process modeling is a mechanism for describing and collaborating the current or envisioned future state of a business process to achieving the desire result. A process model shows the true image of a complete business process, there is an essential for resounding out business process development and activity relate system (Damij, 2007). In connection that to build the institutions structure and functions in way to adopt a creative, innovative through proper improvement of business process. There is a set of interpretation of patterns and rules in any type model. The developer of the model includes the interferences and practices till completion of the business idea (Bernus, 2006). A model is a set of evidences apprehended in about organized and some structure realities taken by the process model. It is directed a summary of line of action with a formal way to present the real world, somewhere the applicable evidences are stated in terms of about formal way (Brown, Recker, & stephen, 2011). When a semantic gap exists in the system, then a process model is considered to address the real world problem.
4.4 Business Process Model (BPM)

In previous studies different orientation frame works discuss on the industrial mapping and application (Korher, 2006). To establish of meta-model that captures particular concepts of study and address in literature (Faisal, Rub, & Ayman, 2012). Every concept has needed to develop some framework to achieve the study goals and through a development a mechanism to concrete the concept with a process model. Caetano and Tribolet (2006) stated a prerequisite to represent the actor’s skill and services in the organization that business activities are needed by a process model. The business process model enables to dig up the dynamics of ground base activities to find out the concepts variable of the demand and supply of the market, for purpose to enhance the competency of existing activities.

4.5 Business process Model (BPM) approaches

Categorized BPM (Business process Model) approaches into four categorizations by Kuenget et al. 1996:

Business process model categorized in an activity oriented approach to explain the task, activities in a systematic way;

Approaches like the reflection of an object associated as specialization, tradition and collaboration is called object oriented approaches;

A particular set of responsibilities, roles and activities projected through role oriented approach. There are role oriented approaches to define the proper set of role;

The expression of words through debate or word of mouth in perspective theory or action of the language is covered by speech act oriented approaches;
Describing the declarative and imperative development modeling patterns

The paradigms of imperative and declarative process are signifying in business research and discussed with extreme spectrum on big canvas business process modeling patterns (Goedertier, Vanthienen, & Caron, 2013).

**Declarative process** modeling method specifically describe in order to attain the desire corporate goals, should prescribe without an end state be done. Therefore, corporate rules, a conventional constraint is addressed in these models. Business process activities dependencies, logical expression define according the condition. Consequently, that business process model does not allow to violate the procedures, alternative methods are implicitly defined.

In business process management a wide ranging of declarative modeling patterns has been specified, from primary ECA (Event Condition Action) rules (Kappel, Rausch-Schott, and Retschitzegger 1998) a modeling language ConDec is used in declarative process (Pesic and vander Aalst 2006) and business process constraint networks (BPCN) also (Lu, Sadiq, and Governatori 2009).

Noted that Event Condition Action (ECA) ruled can be processed as imperative to their own, process should be followed as they strictly explain how a process completed. However, process model provides a complete picture of Event Condition Action (ECA) and no need to specify all probable transitions. Consequentenly, some restrictions apply by rules defined on it, how the path finally execution of process model should observe under specified way.
**Imperative process:** Imperative process control system flow based on graphical modeling language, here imperative modeling approached described in context of accurate and focus on modeling of the process model.

Now days, Process modeling approached are commonly conducted in this pattern. Mostly, process modeling language flow control of activities is based on the primary constructs of graph process base dependencies between control-flow and process activities .Respectively, several process base graph offer the additional constructs and a set of activities e.g., Information about an event, object based data or relative organization. Process model languages (Modeling) have been conducted with multiple graph base process; in the other petri Net (based) modeling (Zisman 1977; Ellis and Nutt 1993). BPMN (Business Process Modeling Notation) (OMG 2006). UML (Unified modeling language) activity base process diagram (OMG, 2004), in chain process case of EPC (Event process chain) (Keller, Nuttgens, and Scheer 1992).

The business process model is based to attain the following (Kalpic & Bernus, 2006):

- In the context of better understanding process model minimize the complexity process.
- In perspective on behavior system approaches to develop the best control and clarity;
- Business problem and logical questions easily understand easily through this model approach.
- To acquired new business knowledge capitalization and enhancement of its re-use ability;
- To line the business goals with current knowledge in the improvement of business process;
- Activities and behavior improvement systematically improve with the business process model;

### 4.6 Classifications of business process models and development forms

#### Classes of BPM (Business process model):

There are different kind of business process describe to address and made on base of concepts, features and properties, finally to decide to construct the purposeful modeling process for business. In contest of previous literature, there are two main kind of business process models are given below:

1) Activity models
2) Behavioral models

The aim of process modeling dynamics what characteristics of businesses need to be forming the process model?

#### Activity and behavioral base models

Functions of business process model refer to the activity model, i.e. the “things to be done” or “Tasks” (activities and operations performed within the process). The primary requirement of the Activity model related to the template in which conducted to define ways connection through available resources. Therefore, activity models depict a process by describing:

- Its building (processes and activities, tasks);
- Inputs and outputs conveyed such value base activity for final delivery;
Control relationships; and a set of roles and objects play to need for execution of process model / activity process model.

Under the arrangement of rules in set ways which activities are operated with a flow of formal process capture by behavioral models? This is done openly (Describing a practices), or indirectly (Explanation of rules of evolution, also called social behavioral guidelines). Resources and objects are not necessary for the process or production. Developing of the model depends on the reason that need for completion of behavioral model.

Effectiveness of timing and sequencing of events is critically involved in the modeling process. Business process models are mainly well match on the analysis of business processes (for example, the in the development of simulation models).

Behavioral process models are executing demonstrations of a process (like to a computer degsined package), therefore a use for process control (or process tracking); in this case the objects exchanged and resources used have to be well defined by the business process model (Kalpic & Bernus, 2006).

4.7 Proposing a Process Model

In Pakistan the modern area had verifiably been constructed and highly dependent with respect to significance exchange approaches of nation. Presently, in perspective International scenario the awareness of design porcess has converted toward a diverse comparative approach pattern. With noteworthy issue is emerged with modern intensity due to deficiency of talented professional experienced specialists, designers, professionals, and directors. It is significantly noted three types of major motives of present deficiency exists in different form of capabilities. Initially, main lacking area is
existed in collaboration between academia and organizations. It is highly observed differences between research students capabilities and business firms demand from market to supply the basic necessities of industry. Secondly, present education course design is incapable to meet specialized requirement of labor market. In result, industry is working with out skillfull and non well updated knowledge graduates as required by market. Due to this, business firms are invested a huge amount and preparing the expenses to cater this issue and initiate the special training programe to enhance the employees / labors capabilities to perform the tasks effectively. Further more, this gap is filled by the oversease labor due to lack of these abilities holes. Lastly, the implementation process of employments is became more complicated due to long legal, administrative and technical procedural issues. There are different types of stakeholders met to each other to build the personal contacts for getting the required services to each other. This type of access with researchers and individuals is provided the consultancy, formal meetings, class course accessment and field investigation for members support.

In large level of official connectivity among academic staff / students and firms are created two way consultancy services. Research students at initial stage could engaged with contracts and business projects.

Relatively, business firms is less focused in collaboration in graduates projects. Mostly firms hesitate to start the advance level of research innovation and development. Financial grant and scholarship holder student are treated by corporate sector. Business incubation certer can play a role specially for science and technology under graduates. Corporate sector want to build a collaboration in returns of profits from universities human capital. Firms are selected on bases of employment placement and innovation and
advance level of research from higher education institution because they are expected the profits by linkages. As far supporting the business is need to focus and economical strong institution. progressively deliver research students are more applicable to business firms' s needs. The bolster human capital asset improvement / preparing programs are initiated, lead building consultancy, and upgrade universities-firms collaboration for mechanical and technological critical thinking.

With respect to interviewees’ recommendation on community oriented relations amongst firms and universities, firms and universities ought to straightforwardly team up done in following aspects:

1) Professional education for mechanical, industrial resolutions and arrangements, 2) master trade programs amongst firms and universities, and 3) explore/inventive monetary help to grow new innovation.

The other model is that 4) the organizations may work together through a spinning association which goes about as teammate amongst industry and universities by gathering normal issues from firms and put and urging desire for universities to discover answers for given issues. There are extensive desire demanded by business firms to assist the collaborating support to managerial and government official level. Very few number of firms have claimed a dynamics arrangement between governments institution. A complete guideline on national action plan enforced the industry to participate, specially for multinational firms operate in the country.
Academia is cleared the uncertainty factors which are made a detail consultation and interviews for this purpse. It has focused on training and development programs to act according to the production need of manufacturing sectors. Industry and academia collobaration were seen to fail develop the modern research relations. Both are linked only to supply the trained human capital as previous practices.

Afterward, as inquiry was included in academia side. The main goal of participation is done with national instructional approach. As usual technique for correspondence with business firm was through the distribution and scholarly periodicals.

In terms of acadmic participation, universities as a focal players have two sides to serve in the coordinated effort with government, industry and different associations/organizations;

• University as supplier

Universities are to serve the business in the following ranges:

1) Quality graduates significant to modern and social needs,

2) Research/information/advancement,

3) Incubation administrations,

4) Technology exchange administrations,

5) Solutions to issues/challenges,

6) Management consultancy and training.
• University as demander

Universities require assets and joint effort with both government and industry to adequately serve the business as specified above in the accompanying zones:

1) Financial and hardware bolster,

2) Enterprise procedure to wind up noticeably entrepreneurial universities,

3) Technology exchange from MNC/JV firms,

4) Collaboration with firms for temporary positions, helpful program, and research facility/instrument

In terms of University based research, the innovation and research item advancement from universities' exploration and research department has not been noteworthy. In this manner if the business prevails in high innovation ranges in vehicles’ hardware, there is a low level of commitments originating from University based scientists and researchers. The business and industry desire of the universities was the supply of very much prepared HR, as opposed to the creation of imaginative innovations from logical research. From the business' point of view, the universities were the instructional hubs to produce applicable workforce. Since firms did not get financially significant logical information from the universities, they received a methodology of either building up their own innovation or bringing in cutting edge innovation from cutting edge nations. In spite of the fact that this origination of the universities as the instructional hubs may now be obsolete, firms still consider universities to be ivory towers where teachers are occupied
with straightforwardly distributing and publishing their research work and items and have little enthusiasm for the requirements of industry.

At the contemporary point, the cooperation between the universities and industry in R&D is moderately frail. In cases that there has been such a relationship, the most widely recognized practices are basic financial commitments from organizations to universities and casual coordinated effort, for example, counseling administrations. Communication amongst the industry and the universities has to a great extent been casual and individual. One critical explanation behind this is the guidelines and benchmarks overseeing the universities and employees that don't support the entrepreneurial misuse of university-based research. The examination can be abridged in two general discoveries. In the first place, there are no formal research contracts, however inexhaustible casual linkages. Second, there is a low level of long haul connections.

A clarification for this absence of cooperation is that there are no custom and tradition of shared trust. Firms trust that innovative exercises ought to be performed in-house. They expect that universities don't direct any research that may prompt commercial developments. This is joined with the feedback of the course and pace of universities' R&D. In any case, from the university skilled specialist’s researcher's viewpoint, technological research is regularly viewed as neither inventive nor testing. To all aims and purposes, universities and industry have been working in various different universes.In Pakistan, the universities stay with a low level of collaboration with the industry, both constructing agents and industry part makers. The universities' examined comment themselves that they should deliver graduates progressively important to industry needs, while industry should bolster finance for
research and advance development, and also participate to grow new innovation. In addition, government ought to have a clear policy heading to help the industry.
Proposing a Process Model to Develop A Sustainable Mechanism:

Knowledge Based Economy

Government
Role of Government
- Funding to universities
- Focus on ORIC
- Prepare policy for collaboration
- Sponsoring research and technology
- HEC should play an important role
- Special internship opportunities for graduates
- Monitoring and evaluation system

Through Social Sector & Infrastructure Ministries

National Research Council

Role of Governments
- Funding to universities
- Focus on ORIC
- Prepare policy for collaboration
- Sponsoring research and technology
- HEC should play an important role
- Special internship opportunities for graduates
- Monitoring and evaluation system

Role of Universities
- Produce quality graduates
- Collaboration with firms for internship
- Industry need based Research
- Incubation center within university
- Activate ORIC
- Consultancy trainings
- Innovation and knowledge
- Academic services
- Faculty and professional liaisons
- Seminars and events with industry involvement

Role of Industry
- Financial support
- Internship opportunities
- Request for research on given problems
- Improve competitiveness
- Innovation and knowledge
- Collaboration with universities
- Consultancy/projects services from universities
- Joint ventures
- Training facilities
- Remove barriers for collaboration
- Exchange ideas with faculty

Knowledge Transfer Offices

Science and Technology Park
Training and Consultancy
Incubation business centers
Education Management Experts (HEC)
The proposed model shows the relationship among universities, industry and government. On the basis of interviews and comprehensive literature review we can provide above mechanism to improve the linkage among universities, industry and government. The important key roles of each components are given in the above figure for the improvement.

• University
  • Universities can't create very qualified and modernly important graduates because of the absence of equipment and industrially experienced professional staff and faculty.
  • Universities don't comprehend the idea of the industry; so universities neglect to discover genuine modern needs and their exploration and research yields are not worthy enough to apply;
  • Universities don't get adequate financing from government and industry;
  • Universities don't genuinely participate with other related divisions due to the absence of trust, motivation and incentive and institutional coordinated efforts.

• Industry
  • The business and industries are not inspired by co-creating inventive research with universities due to conceivably low short term returns;
  • Industries have their own particular R&D; it is in this way not important to cooperate with universities which are viewed as lacking limit and a corporate culture;
  • Most firms' R&D is controlled by customers that are outside organizations and foreign in nature, so there is no or just a low level of innovation exchange and research participation in innovation and development;
  • There is a confound between industrial and mechanical short term requirements for benefits and long haul comes back from directing exploration and research;
  • Just a couple of firms are occupied with teaming up with universities(through activities, educating and plan of educational programs) in creating significant graduates since they don't consider it to be financially savvy and would prefer not to give specialized technical information away.
• Government

- Government does not have an unmistakable long haul course to support automotive industry because of interior legislative issues, recently launched international facilitated commerce understandings i.e. free trade agreements (e.g., FTA) and players' irreconcilable situations and conflict of interests;

- The government-supported modern industrial association, Institute, does not have adequate financing and depends on national legislative issues with the bureaucratic methods of the service of industry.

- Universities must produce graduates progressively important to the business' needs through helpful training programs, master trade programs in educating and educational modules outlining and curriculum designing, a venture based learning with industry for technical and mechanical arrangements. These should be possible through, Finding out the genuine requests of the business and co-discovering answers to technical and mechanical problems, Producing graduates with modern limit and critical thinking skills; teaching is extended from address and dialogue to an undertaking mode in which members trade thoughts and plan a typical objective, with teacher filling in as a facilitator, Ensuring that instructing learning mirror the abilities required in industry.

- Where proper, universities may implant entrepreneurial exercises and spirit. This should be possible through;

  - Creating the value base management system to help the firms (SMEs);
  - Creating turn offs and firms to additionally interface with industry and real world business while producing research and development;
  - Creating satellite grounds/learning focuses and programs in the modern group to comprehend the business and work well for it;
  - Utilizing enterprise instruction to prepare understudies and technicians to acknowledge business and corporate esteem;
• Instructing the administrative workforce to oversee associations all the more adequately;
• Creating the innovation exchangeability
• Stretching out instructing from teaching people to molding organizations through entrepreneurial training and hatching;
• Giving a supporting framework for teachers and understudies to initiate new wanders with scholarly, business and conjoint attributes.

Universities should strengthen their research and innovation through, Leading exploration with distinguished business potential; Recognizing, advancing and chipping away at particularly focused research ranges; Setting up an entrepreneurial ethos on grounds through arrangements on incentives and their requirement; Giving adequate hardware and framework infrastructure to R&D; Empowering research oriented teaching methodologies and teaching informed research. Universities should seriously think about adjusting and joining instructional teaching, research and service to accomplish their third mission (where fitting and identified)through, Building up a U-I unit, for example, an innovation exchange office; Urging personnel staff to help and boost the craft of university and industry which can create pay and so forth. Universities ought to know about and consider innovation protecting and licensing; Universities ought to urge their workforce and faculty to give interview for industry to end up noticeably experienced with issues and give arrangement services to advance mechanical and technological competitiveness; Universities should compensate staff who adjust and include themselves with the university's arrangement to advance the competitiveness of industry. Involvement with industry, mechanical exercises help remunerate generally a low compensation for competent personnel staff. These plans will likewise draw skilled individuals into the university.
4.8 Discussion

Salter & Martin (2001) have shown in their work that research in university has exposed that it enhances industrial competitiveness and considered as a driving force of growth. In contrary, Laursen & Salter (2004) provided evidences that a very limited number of firms have taken the universities’ research as a basis for knowledge and information. It sees from the depth the function of engineering knowledge has a vital role in how efficiently the industry needs and training and guidance offered by universities are associated with each other. For the reason that, according to the work of Hensen and Lehmann (2006), the tomorrow’s decision makers are the product of today’s universities education and research offered by both public sector universities and private sector universities. On the contrast in literature we have investigated some other evidences as Nagy and Robb (2008) have explored that it is critical to set up a relationship between industry and the academia to grow and promote sound practices benchmarked on the scientific method of engineering knowledge with the objective of a significant positive effect on the society.

The researches Youtie & Sharpira (2008) have evidence for number of victorious collaborative efforts have described in the previous literature. For-instance the growth of a region recognized for the service offered by the university as novelty as well as advancing knowledge focal point. A number of universities have established research and development department especially to study the linkage between the industry and the university. Among them some of the universities are under consideration are National Chiao Tung University and Technical university of Catalonia. The national Chiao Tung University located in Taiwan have established a separate office for development and research purpose in order to make research valuable to manage the industry and
university association. This particular university has also established research and development Commission to assist and facilitate students and faculty members to publicize their research work as well as to maintain pleasant and warm atmosphere towards the growth of small and medium size enterprises (Methews & Hu, 2007). Likewise, Ferrer-Balas et al. (2009) have shown in his study that in Spain the university named the Technical University of Catalonia has taken a step toward the development of the integration between academia (university studies) and the social needs (Industries). It has fostered a pattern of how academic research, productivity and societal needs can place together.

This form of collaboration and corporation between universities, industry and government have mutual advantages, the students able to know the application of what they have learnt in classrooms as well as firms easily get the transfer of new technologies. This transfer contains the best stakeholders who create and make the course of action achievable; 1) the scientists in universities who are finding out the new and up-to-date technologies, 2) administrators and scientists of universities who are serving as a mediator between firms and academic researchers to manage the intellectual capital, and finally, 3) entrepreneurs/ firm managers, who are publicizing technologies discovered by universities.

According to Gulbrandsen & Smeby (2005) industrial, financial support produce a boost on the number of developments-schemes with partnership involving university faculty members and firms, research organizations and colleges in the areas, which directs to commercialization and publications of drawing products for the mutual benefits for all involved organizations. In addition, the associations between universities and business
groups should create value in terms of prospective to disperse understanding of knowledge, which directs to constructive impacts on the economy of a country (Guiliana & Azra, 2009).

Restricting the distance linking academia and business group should affect in an improved translation of academic knowledge to accurate and right additional significance for the fruitful entities. It is the opinion of the investigators that the corporation between academia and Latin America is merely not well-built sufficient. Whilst the conservation with colleagues in both sides of the subject matter, this condition have a tendency to be the rule rather than exemption. Even in graduate and undergraduate both seem it is true.

A few numbers of the previously perceived aspects that might assist to give details on this teamwork gap in Latin America are the deficiency of novelty culture in the industry and in the growth of education as a transformative force. In addition, the work of Carvalho & Etzkowitz (2008) has explained that the Latin America has a keen attention from many decades on the political side of the universities as compared with its economic role. This latter idea; the economic role of education is comparatively new. In reality, the Latin American universities are main hirers for researchers. The work of Thron & Soo (2006), has given details that for those countries like Colombia, Brazil, Argentina, Mexico and Chile almost above 60% of researchers are employed by prestigious universities. This absolutely directs to the requirement for linking academic competencies to industrial requirements. It also leads to produce novelty, technical, and practical competencies.

A considerable effect on regional based economic development is also a result of universities. Similarly, Armstrong & Taylor (2000) show evidence that this considerable
effect can also effect to distinguish the long as well as short run impacts. The short-run multiplier impacts are primarily all the way through universities; as these universities employ the restricted/local workers as well as utilizing big areas of land and demanding for confined local services. On the other hand a long-run effect on universities shows a chief impact on regional development (economic development). It can be seen in the following ways:

Universities have improved the worth of localized labor by means of preparing and training alumnae.

- Universities have a vital role in a region as it acts as an encouragement for localized industries to get more diversified their operations to utilize it well-skilled graduates.

- Well-skilled faculties of universities make available professional and expert instruction to localized development agencies and local industries.

- The existence of academic institutions like universities in a region improves the economic as well as cultural magnetism of a region for other restricted firms and well trained workers.

Such long-run impacts have achieved a focal place in local or regional studies, policies and strategies in research, as well as research at a higher level since the late 1990. These are frequently known in the concept of the Triple Helix Framework. The growth of the Triple Helix model is along with the increase of the knowledge based economy and advance system, in which economic growth is based on consistent novelty and the development of scientific knowledge and technology.
The work of Etzkowitz & Leydesdroff (2000) and Leydesdroff & Etzkowitz (1998) shows that one elementary declaration in Triple Helix research work is that this framework shows the relationship between university-government-industry these relations are essential situation for promotion, improvement and advancement. Etzkowitz (2008) have given evidence that mainly universities have altered the organization from secondary to primary for economic growth in the up to date social order.

As recommended by Etzkowitz (2008), a Triple Helix Framework in general initiates as government, industry, and university go through a reciprocal affiliation with all other in which all attempts to improve the performance of the other. The motivation behind the collaboration is a promising certainty that technology and knowledge becomes a focal point in economic development. The speedy growth and growing complications of technology can fundamentally change the environment of numerous types of institutions. It has been comprehended that the capability of the solitary organizational sector only is no longer react to the transforms and uncertainties, but for they assist to each other. For instance, universities and other knowledge producing institutions built up the central spiral of knowledge creation. Universities produce additional knowledge to the institutions or organizations and industries to make stronger the piece of research.

The author Etzkowitz (2008) also depicts that the novel inter organizational associations direct to the inside alteration within each cluster of the institutions and therefore directs to the major distinctiveness of Triple Helix, that is “Taking the role of the other”. It clearly meant that in addition to perform its conventional responsibilities (as most important primary activities) each take the responsibility of the additional secondary activities. The firm consistently make products like goods as well as services however it also carry out
research and offer training and guidance at higher stages or higher levels, for instance through corporate universities.

Government is accountable to settle the market breakdowns by allocating market rules and providing public policies. Likewise, it also constructs and makes the availability of some undertaking capital to initiate up to date enterprises, especially for highly risky businesses. Universities persistently remain their traditional function and responsibilities of education and research, but also dedicated to make capitalization of knowledge, startup corporations, and patents. Associated to this a number of similar ideas are developed, like as, “academic capitalism” (Slaughter & Leslie, 1997), “entrepreneurial university” (Clark, 1998; Etzkowitz, 2003), “model 2 of knowledge production” (Gibbons, 1998) and “the third mission of university” (Molas-Gallart, Salter, Patel, Scott, & Duran, 2002).

The inside alternations also have effect on challenge inside and across sectors. The same as a result, they must have further close collaboration and communications among themselves. Therefore, an additional important factor of the Triple Helix Framework/Model is the trilateral connections among government, industry, and university. In the Triple Helix Framework, single spiral has noteworthy control on ten other. In the meantime, all the way through communications, institutions in each twists are able to discover novel thoughts from others to resolve troubles and meet novel requirements. This practice is differentiated by growing interdependency among the three divisions. For example, Knowledge production of universities cannot be approved entirely by itself, however requirements industry as not merely a foundation of research troubles it also well-built associates in knowledge making.
In mean time, technology transfers by universities are reliant on the circumstances or surroundings by the government. The connections in addition consequence in the formations of mixture associations, such as incubators, combined research center and scientific elements, etc. The Triple Helix model built up from two contrasting point of views named as Statist and Laissez-Fair Model. The Statist Model depicts that government controls both industry and academia as well as government shows the way in developing productive projects and producing more funds from newly taken projects. There are a couple of examples in the former Soviet Union and even in many Latin American Countries. On contrast the Laisses-fair Model shows that all of the sectors government, academia, and industry are self-governing and independent of each other. The only way to interact with each other is possible at across well-built boundaries. This model seemed in Latin America.

According to Audretsch et al. (2012) and Hanel & St-Pierre (2006) because of globalization, there is need of additional associations and developments so that it becomes possible to be more competitive across a globe. The main source of development among collaborated organization to become more developed and take benefits is research and development associations. For instance, this type of cooperation helps different industries to boot and more grow to become more innovative and competitive as a result earn more profit. Likewise Philbin (2008) and Dooley & Kirk (2007) have given the evidence that this ultimately leads to the better and improved academic results of universities. In contrast, it has been observed that in Malaysia still the collaboration between industry and university seems to be very few (Aslan, 2006, Chandran et al., 2009, and Hamisah Tapsir et al., 2010). The Hamisah Tapsir et al. (2010)
show that the matters in the collaboration between industry and university are not well-known especially, because of the disparity connecting both the organizations involved. It be probably fixed through the research and development collaboration among the organizations to make successful practices in this era. Thune (2011) also shows the evidences on the collaboration between university and industry determine the successful factors. According to Chin et al. (2011) and Barnes et al. (2002) choosing appropriate partners is an essential aspect for flourishing industry and university research and development collaborations. In Malaysia, as described above have seen very limited research and development collaboration as a result, universities have improper strategies to attract valuable partners for research and development purpose. Hemmert et al., (2008) had shown evidences that a good number of firms in Korea across for partners from academic institutions (specifically universities) surrounded by their own private networks. While on the other hand, in Japan different firms elect their partner groups all the way through educational meetings at universities, transfer centers of universities, and publication hubs.

There is importance of choosing desirable research and development partners, for this a firm’s openness is necessary. The word openness is specifically used here as the ability and capability to transform the knowledge among different firms and their collaborated partners (Faizan et al., 2011). On the other hand, some other studies have shown in their studies that the well reputed organization have more access to obtain desirable partners. So, the reputation of nay organization has a vital role in choosing the desired partner (Dunowski et al., 2008, Nokkala et al., 2008, and Mora-Valentine et al., 2004). The study of Nokkala et al. (2008) shows that the status of the partners can be well
determined based on the overall information that has been gathered through different sources about them. For example, the work of Seigel et al. (2007) shows that the reputation of university researchers such that the high citation researchers and their ability to do world class research can easily influence well reputed firms to show interest for collaboration with them. Likewise Dunowski et al. (2010) shows that, firms prefer for collaboration with other organizations by means of competency of an organization along with the personal relationship with them. According to Howell et al. (2008) usually the research of partners and technical abilities documented as a main factor in choosing best partners for the sack of collaboration. Some other academia like Cyert & Goodman (1997) and Mora-Valentine et al. (2004) have shown the evidences as the most desired partners are those partners involved in earlier collaborations.

Nishimura et al. (2011) have shown in their paper that preceding practices in research and development partnership can assist to build up trust, expertise and proficiency between the partners (Thune, 2011). This ultimately raise the likelihood of both associated organizations and the research and development partnership efficiently (Nokkala et al., 2008), and amplified opportunities for well-doing research schemes. All the experiences gained from collaboration have significant and positive associations to lessen the barriers of orientation. However, it tend to high the limitations associated to the intellectual property (Bruneel et al., 2010). According to the Thune (2011) the important point that enhances the motive of celebration is gained through the experience and knowledge all through the university and industry collaboration. Another study has evidences on comparison among different country’s frequently collaboration process.
According to the study of Hemmert et al. (2008) Japan is comparatively more experienced than Korea in making collaborations. This ultimately shows a higher number of expertise and successful collaborated projects. Another relative aspect that ought to be well thought-out is “proximity”. Based on the research performed by Thune (2011), the proximity of association collaboration offered to the geographic proximity. Like the proximity connecting partners that can be considered as the physical gap between both the researches associates (Mansfield & Lee, 1999). According to the D’este et al. (2011) Organizations that are strongly positioned have a superior opportunity of launching innovative research collaborations.

A research on the collaboration between university and the manufacturing firm in Canada demonstrates by Hanel & St-Pierre (2006) shows that the proximity is a vital factor of collaboration with huge success. Almost 70% of collaborated manufacturing firms with academic institutions (universities) are situated surrounded by 100 KM. Likewise another well-known study shows by the work of Gracia et al. (2010) and depicts 71.6% of such collaborations surrounded in the same area.

Similarly, Santoro (2000) gives evidence of geographic proximity as a vital role in enhancing the outcome producing through collaborations between universities and the industries. In addition Kamariah et al. (2008) show a significant relationship between both collaborated parties (universities and industries)

In contrast a research by Laursen et al. (2011) shows that geographic proximity between firm and universities have insignificant result. It clearly shows the evidence that this factor has no importance in creating successful collaborations among different industries and the universities. The reason behind the insignificant result shown by the author is that
the potential collaboration can be enhanced because of less cost of communication as well as the belief developed by proximity, has more chance of attention when the collaboration exists within the person or close relationships. There are some other researchers that are supporting the insignificant result of geographic proximity between firm and universities like Mora-Valentin et al (2004) and Nokkala et al. (2008). Consequences from this research demonstrate that the position of collaborating groups is not a barrier in launching successful research and development collaborations. As an alternative, only conferences can manipulate the success of research and development schemes and projects. Okamuro & Nishimura (2011) also have the same opinion that geographical aspects are not significant. This is confirmed by their results, which affirm that place of both organizations has a negative effect on the contractual and institutional aspects in founding collaborations.

Several researchers have argued that inside the remit of the third process industry and university research collaborations are tremendously vital systems for producing scientifically spillovers. These types of collaborations give positively to concentrate on novelty market break down and help comprehend the full social proceeds of research and development projects (Martin and Scott, 2000). Furthermore, there is a shows potential empirical literature presenting a growing level of academic research, such as patenting and licensing, and creation of spin-out firms (Shane, 2004, Thursby and Kemp, 2002). This has been come with by an enhancement in research joint projects (Hall et al., 2001) and combined technological publications (Calvert and Patel, 2003). There are several governments that have introduced a wide range of policies and encourage the involvement of universities in technology transformation.
CHAPTER 5

CONCLUSION

This chapter shows the conclusions and suggestions got and derived from this investigation and the connection amongst universities and industry in the knowledge learning economy.

5.1 Conclusion

Based on results, there is a weak linkages and necessary to improve the collaboration of UIG. Application of theoretical knowledge in the real world depends on the cooperation between institution in relation to management. The outcomes will help the academician and practitioners in strengthening the linkages between universities and industry and provide the basis for impactful knowledge generations in order to enhance the industrial differential advantage. The proposed model our study is broaden the understanding of the knowledge based industries within the developing economic structures and further extend the existing body of knowledge within the area of economic development, competitive strategy, public policy, organizational development, government-industry-university interaction and higher education.

With respect to coordinate the connection amongst university and industry above, there is a wide hole between the absorptive limits of privately owned businesses and information, creation of universities on the grounds that of technological and limit requirements with respect to the two accomplices, as said prior. The majority of Pakistani universities stay concentrated on undergrad educating. Just a couple of public universities have found a way to change themselves into research oriented universities, while most organizations are not keen on R&D and don't request modern scholarly administrations.
In this manner the immature U-I-G relationship is inferred from the three gatherings, to be specific universities, industry, and government. The shortcomings of the U-I-G relationship which should be enhanced are condensed as in the following lines:

• University

  o Universities can't deliver very qualified and industrial relevant and significant graduates due to the absence of hardware equipment and modern industrial experienced faculty member;

  O Universities don't comprehend the idea of the industry; so they disregard discovering real industrial needs, and research yields are not noteworthy to apply;

  o Universities don't get adequate financing from government or industrial and technological help;

  o Universities don't truly coordinate with other related divisions due to the lack of trust and confidence, motivator and institutional joint effort.

• Industry

  • The business is not inspired by co-creating imaginative research with universities in view of conceivably low short term return;

  • Industries have their own particular R&D; it is along these lines not important to participate with universities, which are viewed as not having the ability and corporate culture;

  • Most firms' R&D is controlled by customers that are foreign organizations; so there is no, or just a low level of innovation exchange and research participation for new development
- There is a crisscross between short term modern industrial needs in benefits and long-term returns from leading research exploration;

- Only a couple of firms are keen on teaming up with universities (through curriculum, undertakings and teaching) in creating pertinent graduates, in light of the fact that they do not consider it to be money saving advantage powerful and don't have any desire to give specialized knowledge away.

- **Government**

  Government does not have a clear long haul course to help industry because of inside legislative issues, recently propelled global facilitated commerce understandings (e.g., FTA) and players' irreconcilable situations;

  o The government-supported industrial association does not have adequate financing and depends on national legislative issues with the bureaucratic techniques of the service of industry.

To additionally build up the intensity of industry, universities have two parts to serve the group, as a team with government, associations/establishments, and industry;

- **University as supplier**

  Universities are relied upon to serve the business in the accompanying ranges:

  1) Quality graduates applicable to modern and social needs,

  2) Research/information/development,

  3) Incubation administrations,

  4) Technology exchange administrations,
5) Solutions to issues/challenges,

6) Management consultancy and preparing

• University as demanding

Universities require support and coordinated effort with both government and industry to effectively serve the business as saying above in the accompanying regions:

1) Financing and equipment gear bolsters,

2) Enterprise procedure to wind up plainly entrepreneurial universities,

3) Technology exchange from MNC/JV firms,

4) Collaboration with firms for entry level position, helpful program, and laboratories

5.2 Recommendations

It could be more powerful just if some U-I-G systems are balanced to create more certainty, shared trust and basic enthusiasm among the three accomplices, while improving adequacy and the proficiency of units/instruments inside.

From the study, the focal issue that represses a compelling coordinated effort of U-I prompting industrial competitiveness is the low level of certainty/common trust among players prompting low levels of competition among players caused by the absence of limit and adequacy of university in delivering to the desires of industry, the low absorptive limit of firms, firms' dependence on foreign innovation and a government that needs viable correspondence, clear bearing/arrangement and an recognized powerful controlling association. Proposals to additionally improve fruitful relationships amongst universities and the business in the information based economy are thus the following:
1) Where proper, universities that are keen on a modern relationship should identify and extend their customary missions (educating and inquire about), to the third mission of monetary, social and industrial advancement.

2) To enhance connections and upgrade certainty/common trust among universities, industry and government, an arrangement of suggestions is as per the following:

• Government

Government ought to have clear course and correspondence to help the industry; Government ought to completely bolster the Institute to become the significant supporter of industry by giving testing hardware, and block awards, together with a more elevated amount of self-governance; Government ought to set up a reasonable clear policy arrangement and a host office on industrial clustering to improve cooperation among players for competitiveness of the business through trade of data, innovation/information transfer, sharing of assets, collective research, and HR advancement (through governmental apparatuses, for example, motivators, concedes and charge credit); Government ought to give budgetary and equipment support to universities working modern help units, for example, an innovation exchange office, incubation unit, and so forth.

• Universities

To build up the certainty of industry and mastery in the field, in addition to collaboration with household domestic industry, universities may either set up organizations with MNCs in cutting edge advanced nations/outside foreign establishments in designing or
send employees to pick up encounters/abilities from MNCs, remote foundations and other research organizations.

Universities must produce graduates progressively important to the industry's needs through helpful training programs, master trade programs in instructing and educational modules planning, venture based learning with industry for technological arrangements. These should be possible through, Finding out the genuine requests of the industry and co-discovering answers for mechanical industrial issues.

Creating graduates with industrial capacity and critical thinking skills; teaching is extended from address and talk to an undertaking mode in which members trade thoughts and plan a typical objective, with teacher filling in as a facilitator, Where suitable, universities may insert entrepreneurial exercises and spirit. This should be possible through; Creating brooding incubation service administrations and testing service administrations to help firms (SMEs); Creating turn offs and firms to additionally associate with industry and certifiable business while producing advancement; Creating satellite grounds/learning centers and programs in the modern industrial bunch to comprehend the business of industry and work well for it; Utilizing enterprise instruction to prepare understudies and specialists technicians to acknowledge business and corporate esteem; Teaching the administrative workforce to oversee and command associations all the more adequately.

Creating innovation exchange capacity Stretching out teaching from teaching people to molding organizations through entrepreneurial training and brooding; Giving a supporting foundation and infrastructure to teachers and understudies to initiate new wanders with scholarly intellect, commercial business and conjoint attributes.
Universities ought to reinforce their examination and advancement through, leading exploration with recognized business potential; Recognizing, advancing and dealing with particularly competitive researchers such as; Building up an entrepreneurial ethos on grounds through arrangements on incentives and their requirement; Giving adequate equipment and framework to R&D; Empowering research-informed teaching and instruction for well-informed educated research. Universities should seriously think about adjusting and consolidating educating, research and administration accomplish their third mission (where fitting and identified) through. Building up a U-I unit, for example, an innovation exchange office; Urging workforce staff to help the craft of university and industry which, thus, can produce some finance, and so forth.

Universities ought to know about and consider innovation, protecting and authorizing; Universities ought to urge their workforce to give consultation for industry to wind up their energies to experience the issues and give arrangement services to advance modern competitiveness; Universities should compensate staff who adjust and include themselves with the university's approach to advance the competitiveness of industry. Involvement with industrial exercises helps remunerate generally a low pay for competent workforce staff. These plans likewise draw equipped individuals into the university. To accomplish the powerful, coordinated effort among government, establishments, universities, and the industry, there are no less than three models of competition to upgrade the viability and intensity of the industry.
**Model 1:** This model sets a halfway association upheld by government as the extension between singular firms and individual universities (see Figure below).

![Diagram](image1.png)

Figure 5.1: U-I-G Model 1

**Model 2:** This model supports each gathering of firms and universities to participate and contend among themselves through affiliation/association while a governmental controlling association fills in as facilitator and enhancer of such connections (see Figure 5.2 below).

![Diagram](image2.png)
Figure 5.2: U-I-G Model 2

Model 3: Like the second model, this model energizes each gathering of firms and universities to collaborate and contend among themselves through affiliation/association while government underpins each gathering to facilitate through supporting strategies (see Figure 5.3 below).

Figure 5.2: U-I-G Model 2

Figure 5.3: U-I-G Model 3

In Model 1 and 2, the middle of the road association including agents from universities, industry and government is the focal point of coordination and arrangement making, while Model 2 and 3 stress the grouping of the two universities and firms to upgrade the advantages of rivalry among themselves. In the three models, government assumes an essential part in supporting the development and adequacy of a focal organization while empowering the foundation and operation of such bunches through arrangements, motivators, subsidizing and different instruments.
According to the respective models above, government is recommended to operate on the basis of Model 2 as the following:

1) Government (for example the Commission on Higher Education) should establish an “Industry-University Cluster” with an executive body, to support the industry to be a center of universities’ cooperation;

• In the business university bunch, the government should build up and bolster asset community for office sharing and innovation exchange;

• Results of the business university bunch's methodology can be distinguished as the after effect of competition in the following ranges;

• Human asset advancement,

• Instrumental administration,

• Innovation research,

• Exchange of data,

• Technological exchange,

• Bridge between players with reciprocal qualities,

• Shared-esteem and collaborative environment condition for the joint effort;

2) A governmental transitional association ought to be recognized as the focal association that ought to be given more prominence independence and adaptability to help the opposition of various players with more prominent productivity and adequacy.
3) Government and its moderate associations should utilize more compelling methodologies in imparting their dreams and vital plans on the competition and linkages among players through motivators and instruments.

Universities assume their part as associates in the partnership drove model to fortify more compelling coordinated effort, through the diverse measures suggested previously.

In this enterprise corporation led model demonstrate, government furnishes driving firms with help as a fundamental piece of its modern industrial arrangement. The part of the university in this model is as an associate in the company's development, to a great extent incremental in nature. Understudy ventures, from BA to PhD investigate, concentrate on industrial problems and might be mutually managed by organization analysts who infrequently hold staff status at university. In the corporate-drove model, the science stop ordinarily gives a home to R&D units of firms whose remit is to arrange universities' agreeable projects and select and recruit future representatives. University departmental offices and vital strategic units are to be produced to help particular ventures.

What's more, the group of universities needs to enhance its ability in industry by shaping bunch to upgrade their intensity and industrial importance, through sharing assets/equipment, creating staff skills, making shared esteems, improving learning exchange, better situating themselves as far as their quality and arrangements (and conceivably even geologically/physically) while communicating with industry.

These improve a more grounded linkage and information exchange amongst MNCs and universities. In addition, the Pakistani Institute must extend neighborhood industry technical support providers and universities through coordinating firms and universities for industrial arrangement discovering/R&D, consultancy programs, training, master
trade programs, helpful undertakings, and temporary position and internship programs. These initiatives for collaboration could prompt information and ability exchanges, universities' better understanding of industrial requirements, learning open positions and participation to deliver R&D and human assets serving the specialty markets.

There are extract of above stated recommendations and stated below highly recommended description for quick relief

- To adopt a powerful U-I-G systems to create a balanced shared trust and basic enthusiasm among the three accomplices.
- To enhance the connections and upgrade the process and build the trust among universities, industry and government.
- Universities must produce graduates progressively important to the industry's needs through helpful training programs, master trade programs in instructing and educational modules planning, venture based learning with industry for technological arrangements.
- Government may revise their policies and setting the priority for research and development.
- To establish a moderate associations and compelling practices in imparting their dreams and vital plans on the competition and linkages among players through proposed model.
5.3 Managerial and Practical Implications

The Managerial implications will be implemente before recognizes the difficulties and challenges through process model in realizing competition between universities and industry to accomplish to bring the level of ability in industry's competitiveness. This research will help the industrial manager and researcher to demonstrate a hole between organizations' innovative with universities' research and teaching. Universities will made the stride up from establishments of teaching toward research oriented activities, while most Pakistani organizations are not keen on R&D and do not demand refined scholastic administrations since their R&D is controlled by remote customers. In addition, universities and organizations concur that most universities will become more efficient limit and assets to successfully create technological important graduates and pertinent researchers, while organizations will be connect with long haul joint efforts with universities due to their cost benefit analysis being on a transient premise. These will stimulate the trust between the three groups of players. Additionally, government has not assumed a dynamic part in elucidating their future vision of the industry, connecting distinctive players in the esteem chain, and distinguishing a focal association to enhance the industry intensity with adequate assets, adaptability and autonomy.

To accomplish this, the government will provide the facility to advance a business situation of high profitability, through the change of the ability and efficiency of nearby providers especially in the second and lower levels. Pakistani exports will be increase due to this linkage and through practical implications of the study. Pakistani institutions will texture the dynamic change and alongside the Board of Investment's incentives to pull in MNCs with priority activities, for example, decrease the imports due to increase in
national production, these specialty showcase steps offer Pakistani industry a chance to additionally draw in and connect with the MNCs.

An implementation of study will enhance the capacity and efficiency of industry to be foci and competitive and alluring for local firms, MNCs, government-supported associations, (for example, must assume a dynamic part to include universities, research institute foundations, related associations and key organizations to create human asset improvement programs, an testing centers, and a platform for specialists to build up sub-groups of aptitude and industry parts fabricating innovation.

What's more, the government will prescribe to give MNCs tax incentive motivators and additionally other conceivable advantages while giving universities monetary help to set up master trade and advancement programs, which may incorporate agreeable activities and entry level positions for understudies.

5.4 Future Research

There are directed for future research to establish new foundations and explore new areas and enhancement of concept variables of three players. The empirical testing of proposed model is also directed for next researchers. It will contributes like present research enhances capacity and competitiveness of the industry and its players (UIG). Technical organizations must be empowered through government arranged policies, for example, incentive plans to create a higher value-added product identified with the recognized specialty markets, for example, electronic infusion frameworks, shape and apparatuses, electronically monitored slowing mechanisms and substrates for exhaust systems to increase the value of nearby generation while facilitating absorptive limit and specialized learning.
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Appendix A:

Structured Interview Sheet for Universities

**GENERAL INFORMATION**

October 2016

**Gender:**  ◐ Male  ◐ Female

**Age:**  ◐ 25-30  ◐ 31-40  ◐ 41-50  ◐ Above 50

**Education:**  ◐ Graduation  ◐ Masters  ◐ Professional (CA, ACCA)

**Current Job Experience:**  ◐ Less than an year  ◐ 1-5 years  ◐ Above 5 years

**Current Designation:**

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1) How does the university directly involve in the industry?

2) How does the university promote the research and Knowledge transfer?

3) How does the university directly involve in the research to support the entrepreneurial culture of industry?

4) What are the special features of university highly regarded by industry/firm?

5) What are the university’s research spin-offs?

6) How does the university develop entrepreneurial culture to support the firms?

7) Does the university have any programs to support the graduates establishing new companies?
8) What kind of processes does the university use connect between firms and the graduates?

9) Where is the university’s research financing allocated from?

10) Does the university establish the science park for strengthening the interaction between the university and industry?

11) Does the university develop any internship programs with the industry?

12) Does the university have skilled-training joint with the industry?

13) Does the university have consultancy with the industry? If yes, how?

14) Does the university have incubation services to support the industry?
Structured Interview Sheet for Government Institutions

GENERAL INFORMATION
October 2016

Gender:  ○ Male  ○ Female

Age:  ○ 25-30  ○ 31-40  ○ 41-50  ○ Above 50

Education:  ○ Graduation  ○ Masters  ○ Professional (CA, ACCA)

Current Job Experience:  ○ Less than an year  ○ 1-5 years  ○ Above 5 years

Current Designation:

1) What is the position of your institution?

2) How does your institution research and work cooperating with the industry?

3) How does your institution develop entrepreneurial culture to support industry cluster or firms?

4) Does your institution have any programs to support the graduates of university establishing new companies?

5) What kind of processes does your institution use connect between firms to the graduates of the university?

6) Does your institution establish the science park for strengthening the interaction between the University and industry?

7) Does your institution develop any internship programs in the industry?

8) Does your institution have skilled-training joint in the industry?
9) Does your institution have consultancy to the industry? If yes, how?

10) Does your institution have incubation services to support the industry?

11) Does any mechanism exist for implementation of research projects?

12) Does the government determine the direction and policy on the linkages between university and industry? If yes, how is the policy? If not, what is the impact on the cooperation?

13) How the government institution could support firms to develop firm’s competitiveness and sustainability?

14) What is the appropriate cooperation model among government institutions, university and firm? (Government institution’s role, University’s role & firm/cluster’s role)
Structured Interview Sheet for Industry

GENERAL INFORMATION

October 2016

Gender:  ○ Male  ○ Female

Age:  ○ 25-30  ○ 31-40  ○ 41-50  ○ Above 50

Education:  ○ Graduation  ○ Masters  ○ Professional (CA, ACCA)

Current Job Experience:  ○ Less than an year  ○ 1-5 years  ○ Above 5 years

Current Designation:  

1. Does your firm have policies on Firm’s competitiveness?

2. Does your firm have policies on creating the linkages with universities and government institutes?

3. Does your firm have policies to focus on research base activities?

4. How does your firm collaborate with universities on research, technology and innovation transfer?

5. How do some agents (universities and governments institutes and revolving organizations) support entrepreneurs to decrease their dependency from transnational institutions.

6. How does Pakistan become the Asian production base industry and strengthen their firms?
7. How does the presently Pakistani universities-industry cooperation? If we desire the more cooperation, what should each sector (industry, universities, and government) action?

8. How do Pakistani universities, government institutes and revolving organizations push the status of pure Pakistani firms to become closer partners with multinational corporations more than the present?