

A Propose Sustainable Mechanism For Academia And Industry Linkages: Perspective Of Transfer Of Innovation And Technology

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Abstract

A sustainable mechanism between academia and industry is played important role in business. How do the arrangements between academia and industry usually concentrate on the transfer of such knowledge, innovation and technology is need of industry. This study explore the linkages and factors influencing the relationships between universities- Industry. On basis of existing scholarly literature, a proposing conceptual model to improve the linkages among universities, national research institutions and firms, in order to enhance innovation ,Technology and competitiveness in the industry. Present research purpose is define the future dynamic relationship among industry, and universities and redefine the role being played by academia to enhance its productive contribution in the economy. In future this conceptual research will provide the source of transfer of innovation and technology in world business. Further, we suggest to test this conceptual model quantitatively and qualitatively.

Key words: Sustainable, Industry, Academia, Innovation, Technology, linkages.

Introduction:-

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 developing countries, 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 reformations 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.

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.

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. Highly knowledge intensive industries requirement can be cater to 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). The networking and alliance with the industry and other knowledge and innovation centers have become crucial for allowing a smooth and flawless knowledge flow (LIU, 2009).

Literature Review :-

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.

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. Techno polis 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.

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

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 Programs 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.

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 (Uyerra, 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 (Tödting & Trippel, 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.

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).

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 Laissez-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 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 (Hamisah Tapsir et al., 2010). Ramli, F., Lim, W. Y., & Senin, A. A. (2013) 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.

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 s four conceptual models that build highly in modern debate on how HEIs can advantage their industrialized areas.

Discussion

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., 2019). 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 any organization has a vital role in choosing the desired partner (Dunowski et al., 2010, 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 Siegel 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.

Davies, et al. (2021) have shown in their paper that preceding practices in Innovation and Technology transfer 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, ittend to high the limitations associated to the synthesis of literature on university and industry (Sjöo and Hellström ,2019) and intellectual property right limitation described by Bruneel and other researchers (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 allthrough 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 (Kurpayanidi. et al. 2020). 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 (2002) gives evidence of geographic proximity as a vital role in enhancing the outcome producing through collaborations between universities and the industries. In addition Ramli, and Senin (2021) 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.

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.

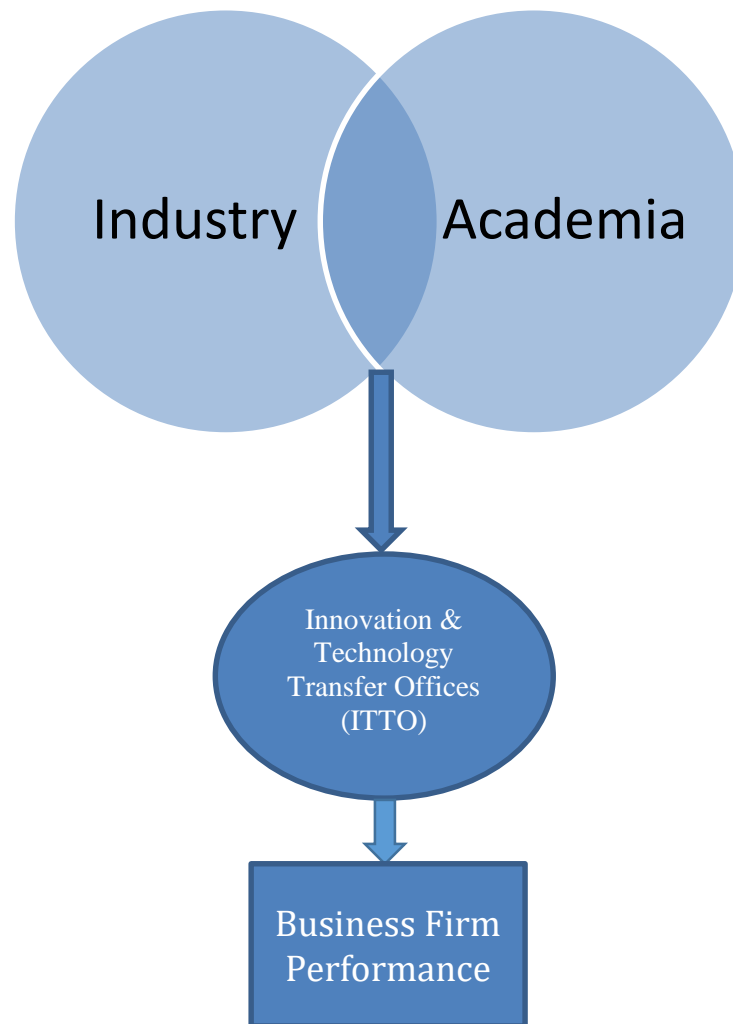
The researches Youtie & Sharpira (2008) have evidence for number of victorious collaborative efforts have described in the previous literature. For-instance the growth of a region recognized for the service offered by the university as novelty as well as advancing knowledge focal point. A number of universities 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. Particular universities have also established research and knowledge transfer offices 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 (Brantnell and Baraldi, 2022). 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. Latest development during covid-19 pandemic a sustainable innovation model base research don

with new developments goals (König, .et al., 2021)

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 and Azra, 2009).

A Propose Sustainable mechanism for Industry and Academia



This model supports each gathering of Industry and universities to participate and contend among themselves through affiliation/association while a controlling association fills in as facilitator and enhancer of such connections to collaborate and cope among themselves through common interest to facilitate through supporting activities and strategies in perspective of innovation and technology.

Conclusion and Future Research

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 technology and innovation based nexus for developing economies.

In 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 process 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 student's capabilities and business firm's 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 without skillful 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 program to enhance the employees / labors capabilities to perform the tasks effectively. Furthermore, this gap is filled by the overseas 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 assessment 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 center can play a role especially 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 firm'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.

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