Artículo de investigación

Educational Reforms needed for creation of knowledge economy: A case study of Punjab Pakistan

Reformas educativas necesarias para la creación de la economía del conocimiento: un estudio de caso de Punjab Pakistán

Reformas educacionais necessárias para a criação da economia do conhecimento: um estudo de caso de Punjab Paquistão

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Abstract

In current era the economic growth depends on the creation of knowledge economy and production and distribution of knowledge has become the critical element of economic development. Educational institution play key role in creation and distribution of knowledge. So, the prime objective of the research was to find out the reforms which can help educational institutions to create knowledge economy. Both the qualitative and quantitative approaches were used to collect the data. Teachers, students, and administrators were selected from the both private and public educational institutions of the Punjab, Pakistan. FGDs were arranged to collect the qualitative data and the quantitative data was gathered by survey method. The collected information was analyzed by using descriptive statistics techniques. Access to knowledge, rich infrastructure, funds, incentives, research and development, human capital development and collaboration with the industry are the suggested ways by the respondents to increase the creation of knowledge economy through the educational institutions of Pakistan.

Keywords: Knowledge economy, Educational institutions, Access to knowledge, Rich infrastructure, Funds, Incentives, Research and Development, Human Capital Development, Collaboration with Industry

Resumen

En la era actual, el crecimiento económico depende de la creación de la economía del conocimiento y la producción y distribución del conocimiento se ha convertido en el elemento crítico del desarrollo económico. Las instituciones educativas desempeñan un papel clave en la creación y distribución del conocimiento. Entonces, el objetivo principal de la investigación fue descubrir las reformas que pueden ayudar a las instituciones educativas a crear una economía del conocimiento. Se utilizaron los enfoques tanto cualitativos como cuantitativos para recopilar los datos. Los maestros, estudiantes y administradores fueron seleccionados de las instituciones educativas privadas y públicas del Punjab, Pakistán. Se dispusieron FGD para recopilar los datos cualitativos y los datos cuantitativos se recopilaron por el método de encuesta. La información recolectada fue analizada utilizando técnicas de estadística descriptiva. El acceso a los conocimientos, una infraestructura rica, fondos, incentivos, investigación y desarrollo, desarrollo de capital humano y colaboración con la industria son las formas sugeridas por los encuestados para aumentar la creación de la economía del conocimiento a través de las instituciones educativas de Pakistán.

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Palabras clave: Economía del conocimiento, Instituciones educativas, Acceso al conocimiento, Infraestructura rica, Fondos, Incentivos, Investigación y desarrollo, Desarrollo del capital humano, Colaboración con la industria.

Resumo

Na era atual, o crescimento econômico depende da criação da economia do conhecimento e a produção e distribuição do conhecimento tornou-se o elemento crítico do desenvolvimento econômico. A instituição educacional desempenha papel fundamental na criação e distribuição de conhecimento. Assim, o objetivo principal da pesquisa foi descobrir as reformas que podem ajudar as instituições educacionais a criar economia do conhecimento. Ambas as abordagens, qualitativa e quantitativa, foram usadas para coletar os dados. Professores, estudantes e administradores foram selecionados entre instituições educacionais privadas e públicas do Punjab, no Paquistão. FGDs foram organizados para coletar os dados qualitativos e os dados quantitativos foram coletados pelo método de pesquisa. As informações coletadas foram analisadas por meio de técnicas de estatística descritiva. O acesso ao conhecimento, rica infra-estrutura, fundos, incentivos, pesquisa e desenvolvimento, desenvolvimento do capital humano e colaboração com a indústria são as formas sugeridas pelos entrevistados para aumentar a criação da economia do conhecimento através das instituições educacionais do Paquistão.

Palavras-chave: Economia do conhecimento, Instituições educacionais, Acesso ao conhecimento, Infraestrutura rica, Fundos, Incentivos, Pesquisa e Desenvolvimento, Desenvolvimento do Capital Humano, Colaboração com a Indústria

Introduction

Over some decades the significance between knowledge and economy has been observed. The economists of each country strived to find base of economic increment and as the changes happened on earth the theories has been modified based on actuality. The conventional manufacturing was based upon man power economy and raw materials and knowledge was outside influencer but in present age knowledge plays its role inside the manufacturing. Expenditure on knowledge increased profit, and new products could be formed. Knowledge and its importance in economic issues have become more significant (UNESCO, 2005).

Education is a process through which a society prepares its young people to enter adult life and educates them with social values. Education is the social institution which provides basic and essential knowledge to the members of society such as job skills, cultural benchmarks and ethics. Education is a process of gaining knowledge through theory and practice (Macionis, 2014).

The importance of education has been increased rapidly over the last two centuries and there has been policies regarding to school admission and its duration. School systems has become administrative and has an impact on child's life and it made a strong link between education and job so more the education, better the job opportunities. Education has been a source to increase status in society and economy. In the world, education has been a societal instrument which caused social changes. And societal changes happened when the already present system failed to fulfill the requirements of human beings (Shepard, 1981).

Education brought alterations in human character. The education System of Pakistan lacked in many ways. At first it did not fulfill the requirements of rapidly changing societal situations, it has also become a device which provide job opportunities and tell about morality. It failed to prepare a nation which could fulfill country's set aim. Education has been the most important organization which could make a nation focused on a goal so institutions defined societal issues as educational issues. Educational

institutions have been searching for new ideas to give benefits to society (Maliha, 2013).

In the light of above mentioned discussion the research was designed to find the directions to develop the educational institutions in favor of creation of knowledge economy.

Review of literature

An argumentation is given by Chandra & Yokoyama (2011) that it is illustrated in the reports of World Bank and OECD that the importance of a knowledge economy (KE) has emerged as a key theme in the late 1990s. In these reports innovation and technological knowledge are considered as drivers of economic development. It is important to identify the institutional factors that promote the creation and diffusion of knowledge, and to ensure that economies not at the technological frontier have access to new technologies developed by technology leaders to determine the relevance of the Asian experience to other developing and emerging economies, and the current excitement with the KE. A competitive educational system, excellent information, a capable scientific infrastructure for innovations, highly qualified human resources, and communication technology infrastructure (ICT) are necessary to provide an enabling environment for fostering the challenges KE. Their argumentation demands to identify the factors that can create and diffuse knowledge through education on the other hand it is proposed that through**,** highly qualified human resources, competitive educational system, communication technology infrastructure (ICT), excellent information and a capable scientific infrastructure for innovations the creation of knowledge economy can be enhanced. All these factors are included in the research to throw light on the role of education in generation of new knowledge. Educational Institutions in Pakistan cannot perform well in the race of creation of knowledge economy without having scientific and technological infrastructure for innovation and creativity.

As Pakistan is a developing country and has limited resource so the limited no of opportunities are available for its citizens. In spite of all issues HEC is trying hard to provide maximum financial assistance. Some of the projects of HEC are given here. Prime minister's fee reimbursement scheme for less developed areas (selected regions) is launched to promote higher education in remote areas. HEC Need Based Scholarships are provided to needy students but the number of scholarship is limited that is why it could not be provided to all. Higher education opportunities for the students of Balochistan & FATA is launched to give opportunities to students of those areas where getting higher education is not an easy task. OGDCL need based scholarship program through HEC is a joint venture of Oil & Gas Development Company Limited and HEC to give chance for higher studies who are needy and talent too. USAID-funded merit and needs based scholarship program is also one of those programs which motivate the students who are talent and needy. Indigenous Ph D fellowship is offered to both faculty and students to increase the number of highly qualified persons. HEC is not only providing opportunities to their locals but also for the students of deprived countries like Afghanistan, Award of Allama Muhammad Iqbal Scholarships for Afghan Nationals is launched for this purpose. Gwadar-China Scholarship Program, Indigenous scholarship Aghaz e Haqooq e Balochistan Project, and HEC German Needs Based Scholarship programs are some other efforts made by HEC to promote higher education at national and international level. Research grants also are given to the students and faculty to promote research activities (hec.gov.pk). But increase in their number can enhance research and activities.

Andria & Savin (2018) conducted a study to see the impact of incentives as motivation for innovation. They give opportunity to the patent to take final decision during the process of innovation and ask the owner of company not to interfere during the process. Further, the patents have share in tax incentives on compensation earned by agents from profit sharing schemes. Both the ownership and share in tax benefit both worker and firm and the effectiveness of this method raises the role of labor relative to capital investments. This is proved a standard incentive to increase knowledge economy. Such techniques can promote innovation and creation of knowledge economy in educational institutions too.

Reich (1991) said that Access to knowledge, rich infrastructure, funding and incentives, research and development, human capital development and collaboration with industry are crucial for creation of knowledge economy as recommended by more than 50% respondents.

Methodology

The methodology of the current research is divided into two phases. First phase dealt with qualitative inquiry and second phase dealt with quantitative inquiry. Population of qualitative research was comprised of teachers, administrator, and parents of students from schools, colleges and universities of both private and public sectors of Punjab, Pakistan. FGD were arranged and checklist, field notes, and recorders were used to gathered information. The gathered information was analyzed in the form of themes. The major variables were defined with the help of results get from qualitative research. Survey was used as method in second phase to collect quantitative research. 606 respondents including teachers, students and administrators were chosen randomly from the six public and private universities of Punjab, Pakistan. Interview schedule was designed to collect the information. The collected information was analyzed by using descriptive statistics techniques.

Results and Discussions

Distribution of respondents according to their Perception about the ways through which educational institutions can increase creation of knowledge economy

Redesigning and restructuring is needed for making educational institutions suitable for creation of Knowledge economy as suggested by the participants of qualitative and quantitative research and by other scholars. Olssen & Peters (2005) claimed that knowledge economy is an inconsistent form of economy which caused to restructure and privatize the public sector and educational system. State and educational system is struggling with the help of science and technology to release themselves from older predominantly industrial organizational forms and to adopt knowledge capitalism. States are considered the major owners and controllers of knowledge production in the new knowledge economy and education plays important role in creation of knowledge economy. States are shifting their responsibility of creating knowledge economy to educational institutions.

To perform this responsibility educational institutions have to reform its polices and to find out the perception of people FDGs were arranged to know that what kind of reforms are needed to redesign the structure of educational institutions for creation of knowledge economy. Participants suggested that these reforms include access to knowledge, rich infrastructure, provision of funds and incentives, opportunities for research and development, human capital development, and collaboration with industry. It can be observed that participants are consistent in their responses regarding the functions performed by the educational institutions to create new knowledge and they are not fully satisfied with the performance of educational institutions in this regard and they consider that these are the major hurdles that slow down the process of knowledge generation and at the same time improvement in these variables can enhance the production of knowledge economy in educational institutions. Each variable with its indicator is discussed in a separate table keeping in view the suggestions given by the participants of FGDs.

Distribution of respondents: Access to knowledge

In new economy knowledge plays vital role as the growth of new economy base on production and distribution of knowledge. So, it is suggested by the participant of FGDs that access to knowledge is mandatory for development of new economy that base on knowledge and this is possible when educational institutions provide access E library, library, internet, print media, social media, learn new languages, and updated syllabus. The perception of people in survey is measured on the same indicators.

Table # I explains that how educational institutions can enhance access to knowledge for creation of knowledge. More than half of the respondents give their consent that above mentioned indicators can increase the knowledge through which we can enhance creation of knowledge economy and values of mean and standard deviation show the same results whereas very few were disagreed with the statement. Powell & Snellman (2004) said technologies are the sources to create and disseminate the knowledge and the new economy that is based intellectual capacities technology plays important role. Thus, the access to knowledge should be the priority of the institutions as it is the significant element for production of new knowledge.

Table # 1: Distribution of respondents according to their Perception about the access to knowledge as a way to increase production of knowledge in institutions
N=606

Access to knowledge can be enhanced through(a)	Strongly agree		Agree		Neither agree nor disagree		Disagree		Strongly disagree		Mean	Std.Dev.
	F	%	F	%	F	%	F	%	F	%		
Access to E Library	47	7.8	383	63.2	121	20	42	6.9	13	2.1	2.33	0.802
Access to library	58	9.6	421	69.5	44	7.3	38	6.3	45	7.4	2.33	0.992
Access to internet	81	13.4	417	68.8	64	10.6	25	4.1	19	3.1	2.15	0.816
Access to print media	95	15.7	367	60.6	82	13.5	34	5.6	28	4.6	2.23	0.939
Access to social media	136	22.4	388	64	19	3.1	42	6.9	21	3.5	2.05	0.919
Access to learn new languages	38	6.3	437	72.1	50	8.3	42	6.9	39	6.4	2.35	0.938
Updated syllabus	81	13.4	417	68.8	64	10.6	25	4.1	19	3.1	2.15	0.816

Distribution of respondents: The rich infrastructure

Rich infrastructure includes equipped science and computer labs, class rooms, and provision of furniture, electricity, clean water and toilet is the most important component of educational institutions for creation of knowledge economy. In the survey same indicators are used to measure the perception of people.

Table # 2 described that how educational institutions can improve the infrastructure of educational institutions for creation of knowledge economy. Provision of basic needs can enhance the learning abilities as approved by more than 50% of the respondents; little dispersion is found in their responses and a small number of respondents were disagreed. Ahsan Iqbal (2016) said that we have entered into the knowledge age and innovation and skills are critical for economic growth. Now there is need to know that how knowledge age is different from industrial age that will help us to understand the impact of knowledge on economic growth. He claimed that government is allocating huge resources to developing a knowledge infrastructure which includes equipped science and computer labs, furnished class room, developed human capital and that is crucial to meet the challenges of new economy. The same claim is presented by the respondents of the study.

Table # 2: Distribution of respondents according to their Perception about the rich infrastructure as a way to increase production of knowledge in institutions

Infrastructure of educational institutions can be improved through (b)	Strongly agree		Agree		Neither agree nor disagree		Disagree		Strongly disagree		Mean	Std.Dev.
	F	%	F	%	F	%	F	%	F	%		
Equipped science labs	110	18.2	354	58.4	66	10.9	35	5.8	41	6.8	2.25	1.035
Equipped computer labs	21	3.5	425	70.1	65	10.7	60	9.9	35	5.8	2.44	0.929
Equipped class rooms	79	13	423	69.8	50	8.3	32	5.3	22	3.6	2.17	0.851
Furniture	28	4.6	407	67.2	98	16.2	31	5.1	42	6.9	2.43	0.925

Electricity	82	13.5	419	69.1	54	8.9	26	4.3	25	4.1	2.16	0.861
Clean Water	48	7.9	417	68.8	94	15.5	23	3.8	24	4	2.27	0.819
Clean toilets	188	31	358	59.1	32	5.3	8	1.3	20	3.3	1.87	0.835

Distribution of respondents: The provision of funds

Funding works as fuel in the process of knowledge creation, and educational institutions can provide financial assistance to its members by giving them need based, merit, indigenous, foreign scholarships, and international research grants as suggested by the participants of FGDs and the perception of people is measured in quantitative research by using the same indicators.

Table # 3 describes that how funding by educational institution can increase creation of knowledge economy. Majority of the participants were agreed with the statement that need based, merit, indigenous, foreign scholarships, and international research grants are the important factors through which educational institutions can fund for creation of knowledge economy whereas minority of the respondents were disagreed with the option and that can be observed by the values of mean and standard deviation. Scholarships and local and national research supports play significant role in creation of knowledge as suggested by the respondents. A report presented by United States in 2014 in which funding from agencies and universities are consider as fuel for innovation. It is argued that federal support is only one step, private industry should also be encouraged to invest in education to do research and innovation. Educational institutions also work to find funding agencies to share the burden of finance for research and development.

Table # 3: Distribution of respondents according to their perception about the provision of funds by educational institutions for creation of knowledge economy

Educational institutions can fund through (c)	Strongly agree		Agree		Neither agree nor disagree		Disagree		Strongly disagree		Mean	Std.Dev.
	F	%	F	%	F	%	F	%	F	%		
Need based scholarship	134	22.1	371	61.2	55	9.1	31	5.1	15	2.5	2.05	0.859
Merit scholarship	104	17.2	321	53	60	9.9	80	13.2	41	6.8	2.39	1.119
Indigenous scholarship	142	23.4	329	54.3	62	10.2	50	8.3	23	3.8	2.15	0.994
Foreign Scholar ship	154	25.4	366	60.4	60	9.9	19	3.1	7	1.2	1.94	0.762
International Research support	277	45.7	317	52.3	12	2	0	0	0	0	1.56	0.535

Distribution of respondents: The provision of incentives

Motivation is needed to develop the interest of people in research activities and educational institutes can develop the interest of people by provide them certificate, awards, and payments as recommended by the results of FGDs; the participants of survey are asked to share their perception about these elements and the results are shown in table 4.

Table # 4 shows that how educational institutions can increase creation of knowledge economy through providing incentives. Most of the respondents said that certificates, awards, and payments can motivate people to create new knowledge; mean and standard deviation values supports the same results and few were disagreed with the statement. Ghosh (2004) said that knowledge is a resource locked in the human mind unlike the traditional factors of production land, labor, and capital. Sharing and creating knowledge are intangible activities of human beings and incentives can motivate people to create and share knowledge. Institutions can use the suggested ways to enhance the level of motivation of people for creation of knowledge economy.

Table # 4: Distribution of respondents according to their perception about the provision of incentives by educational institutions for creation of knowledge economy

Incentives are not available (d)	Strongly agree		Agree		Neither agree nor disagree		Disagree		Strongly disagree		Mean	Std.Dev.
	F	%	F	%	F	%	F	%	F	%		
Certificates	90	14.9	308	50.8	117	19.3	86	14.2	5	0.8	2.35	0.927
Awards	69	11.4	237	39.1	262	43.2	38	6.3	0	0	2.44	0.775
Payments	103	17	385	63.5	66	10.9	52	8.6	0	0	2.11	0.782

Distribution of respondents: The improvement in research and development

Research and development activities are important component of creation of new knowledge and it is suggested that these activities can be enhanced through rich infrastructure, funds and incentives, scientific and technological knowledge, incubation centers, human capital development, and collaboration with industry by the participants of FGDs and perception of people in quantitative research is measured by using the same indicators.

Table # 5: Distribution of respondents according to their perception about the improvement in research and development for creation of knowledge

Research and development can be enhanced through(e)	Strongly agree		Agree		Neither agree nor disagree		Disagree		Strongly disagree		Mean	Std.Dev.
	F	%	F	%	F	%	F	%	F	%		
Rich infrastructure	138	22.8	350	57.8	61	10.1	42	6.9	15	2.5	2.09	0.907
Funds	188	31	327	54	59	9.7	23	3.8	9	1.5	1.91	0.828
Incentives	144	23.8	344	56.8	66	10.9	39	6.4	13	2.1	2.06	0.891
Scientific and technological knowledge	54	8.9	432	71.3	58	9.6	45	7.4	17	2.8	2.24	0.824
Incubation centres	77	12.7	392	64.7	86	14.2	24	4	27	4.5	2.23	0.882
human capital development	46	7.6	426	70.3	55	9.1	54	8.9	25	4.1	2.32	0.892
collaboration with industry	63	10.4	386	63.7	71	11.7	48	7.9	38	6.3	2.35	0.987

Table # 5 explains that how educational institutions can promote research and development. Without research and development the process of innovation and creativity cannot take place. Pakistan's educational institutions should follow the above mentioned ways to increase research and development activities as recommended by most of the respondents and very small number of participants was disagreed with the statement and a little dispersion is found in their responses. Asheim (2006) establishment of research center is crucial for growth ok knowledge economy. For promoting research and development activities educational intuitions have to consider the suggestions of the participant to form new policies.

Distribution of respondents: The human capital development

Research and development activities can be performed under the supervision of trained and skilled persons and that is possible when educational institutions provide knowledge, skill, trainings, incentives, and faculty development programs to its members as recommended by the respondents of FGDs. In survey research

people are asked to share their opinion about the same indicators to measure the construct of human capital development.

Table # 6: Distribution of respondents according to their perception about the human capital development for creation of new knowledge

Human capital development can be enhanced through (f)	Strongly agree		Agree		Neither agree nor disagree		Disagree		Strongly disagree		Mean	Std.Dev.
	F	%	F	%	F	%	F	%	F	%		
Knowledge	20	3.3	246	40.6	223	36.8	41	6.8	76	12.5	2.85	1.042
skills	130	21.5	338	55.8	94	15.5	44	7.3	0	0	2.09	0.809
Trainings	118	19.5	299	49.3	151	24.9	38	6.3	0	0	2.18	0.815
Incentive	169	27.9	378	62.4	36	5.9	13	2.1	10	1.7	1.87	0.747
Faculty development programs	142	23.4	382	63	38	6.3	29	4.8	15	2.5	2	0.844

Table # 6 illustrates that how educational institutions can enhance human capital development. According to the majority of respondents above given ways can help the educational institutions to develop their human capital and minority of the respondents were disagreed with the statement and values of mean and standard deviation show a little dispersion in the responses. It can be concluded that without developing human capital we cannot face the challenges of new economy. Brine (2006) extracted from the policy text of European Union that human capital development is vital for creation of knowledge economy. Knowledge, skills, incentives, and training can develop human capital. Further he recommended that we should develop the human capital regardless of their gender, race, and class. The policy makers have to consider the suggestion given by the respondent to develop human capital to enhance the process of knowledge creation in educational institutions.

Distribution of respondents: The collaboration with industry

Collaboration with industry is significant for generation of new knowledge and it is analyzed by the results of FGDs that educational institutions can collaborate with industry by research partnerships, research services, shared infrastructure, academic entrepreneurship, human resource training and transfer, scientific publication, and informal interaction and the suggested ways are used to measure the perception of people in quantitative inquiry.

Table # 7 shows that how educational institutions can enhance creation of knowledge economy through collaboration with industry. Huge number of participants was agreed with suggestion given to improve collaboration with industry and very few were disagreed with the suggestions as little dispersion is found in the responses. Guimon (2013) said that universities and industry can collaboration with each another in many ways to achieve their goals. The above mentioned ways are used to develop low (Scientific publications, Informal interaction) medium (Academic entrepreneurship, Human resource training and transfer) and high (Research partnerships, Research services, Shared infrastructure) levels of links between industry and universities to get different objectives. Most of the respondents agreed that educational institutions can develop link with industry by following the above mentioned ways for research and development and innovation.

Table # 7: Distribution of respondents according to their perception about the collaboration with industry for creation of new knowledge

Collaboration with industry can be enhanced through (g)	Strongly agree		Agree		Neither agree nor disagree		Disagree		Strongly disagree		Mean	Std.Dev.
	F	%	F	%	F	%	F	%	F	%		
research partnership	162	26.7	299	49.3	83	13.7	41	6.8	21	3.5	2.11	0.988
research services	132	21.8	361	59.6	70	11.6	38	6.3	5	0.8	2.05	0.811

shared infrastructure	72	11.9	385	63.5	75	12.4	59	9.7	15	2.5	2.27	0.884
Academic Entrepreneurship	108	17.8	346	57.1	76	12.5	35	5.8	41	6.8	2.27	1.037
Human resource training and transfer	55	9.1	391	64.5	68	11.2	65	10.7	27	4.5	2.37	0.948
Scientific publication	86	14.2	303	50	115	19	54	8.9	48	7.9	2.46	1.09
Informal interaction.	67	11.1	452	74.6	56	9.2	18	3	13	2.1	2.11	0.71

Reich (1991) said that national educational system is important in creation of new knowledge. Access to knowledge, rich infrastructure, funding and incentives, research and development, human capital development and collaboration with industry are crucial for creation of knowledge economy as recommended by more than 50% respondents. So, it is suggested to educational institutions to follow these recommendations to reform the system to make it suitable for creation of knowledge economy.

Main Findings

Numbers of reforms are needed to make educational institutions favorable for creation of knowledge. Respondents gave various suggestions to improve existing educational system to make it suitable for creation of knowledge economy. More than 87% respondents suggested that if access to E libraries, libraries, print media, internet, and social media and to learn new languages will be provided by the educational that could enhance the knowledge of people. These information technologies are considered the major sources of knowledge management and knowledge creation and have abilities to increase the production of knowledge (Powell & Snellman, 2004). About 88% participants recommended that rich infrastructure can enhance creation of knowledge economy which includes availability of equipped science and computer labs, classrooms, furniture, electricity, clean water and toilets. Availability of financial assistance from educational institutions can increase production of knowledge as more than 85% respondents proposed that merit scholarships, need based scholarships, indigenous scholarships, international scholarships and international research support are the sources to increase creation of knowledge. United States in (2014) recommended that funds from universities and govt. should increase to support innovation system for creation of new knowledge. About 85% participants suggested that motivation through incentives in form of certificates, awards, and payments can raise creation of knowledge economy. Brine (2006) argued that human capital is necessary for developing human capital. Knowledge, skills, incentives, and training can develop human capital. Creation of knowledge economy is influenced by human capital development. Rich infrastructure, availability of funds, incentives, scientific and technological knowledge, incubation centers, developed human capital, and collaboration with industry are the sources to through which research and development can be promoted, proposed by more than 85% respondents. Through knowledge, trainings, skills, and opportunities for faculty development programs educational institutions can develop their human capital as recommended by more than 80% respondents. Jalil & Idrees (2013) said that investment is needed to develop human capital for creation of knowledge economy. Collaboration with industry can be enhanced by providing opportunities for research partnership, research services, shared infrastructure, academic entrepreneurship, human resource training & transfer, scientific publication, and informal interaction, proposed by more than 85% participants. World Bank (2013) emphasized on the collaboration with industry is critical for production of knowledge economy.

Conclusion

Access to knowledge can be enhanced through access to E libraries, libraries, internet, print media, social media, and to learn new languages. Rich infrastructure is suggested as key component for creation of knowledge economy and the establishment of infrastructure depends on the provision of equipped science labs, equipped computer labs, equipped class rooms, furniture, electricity, clean water and clean toilets. Financial assistance in form of

scholarships and research support can contribute in creation of knowledge economy. People can be motivated for creation of knowledge economy by providing certificates, awards, and payments. Research and development are considered the driving forces for creation of knowledge economy and these activities can be promoted through provision of rich infrastructure, funds, incentives, scientific and technological knowledge, incubation centers, human capital development, and collaboration with industry. Human capital can be developed by providing knowledge, skills, trainings, incentives and faculty development programs. Collaboration with industry can boost the production of knowledge economy and the link between universities and industry can be developed through research partnership, research services, shared infrastructure, academic entrepreneurship, human resource training and transfer, scientific publication, and informal interaction.

Recommendations

1. Access to knowledge should be ensured by the educational institutions. This is possible when rich technologies will be used and these must be in access of all. Without having access to knowledge new knowledge cannot be produced.
2. Both government and educational institutions have to find the funding agencies for research and development activities. As research and development are deriving forces of innovation and creativity and without financial assistance these activities cannot be carried out.
3. Educational institutions should pay attention to develop infrastructure in favor of scientific and technological information which are the necessary elements of gaining and generating new knowledge.
4. Human capital development should be the priority of educational institutions. Without the supervision of skilled and professional persons we cannot get desired results from research and innovation,
5. Educational institutions should seek directions to develop better links with industry. Without collaborating with industry one cannot understand the need of market and the process of innovation is an expensive task, industry not only directs us what to but also help us to do it with financial assistance.
6. Implementations on these recommendations are critical for the economy of Pakistan. Educational institutions cannot do it alone; they need support from government and industry to fight against the socioeconomic challenges.

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