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Technical and Vocational Education and Technology Transfer: Departments of Computer and Communications at the Public Authority for Applied Education and Training, PAAE&T, Kuwait, As A case Study

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Abstract. The transfer of technology plays a vital role in the advancement of a country, particularly in gulf states where the shortage of skilled and semi-skilled in visible in essential sectors on their economy (e.g., oil, health, water and electricity). The transfer of technology is considered a significant factor in the development, and is most effective and efficient. When it is absorbed in such a way as to provide a springboard for the move into the next stage of industrialization. The transfer of technology to Kuwait has brought with it enormous changes in terms of industrial development, lower the rate of youth unemployment, increase wages, and upgraded the standard of living. However, the success of technology transfer depends extensively on the contribution of the imported technology in building a sound indigenous scientific and technical infrastructure. In other word, the ability to transfer the know-how and know-why to indigenous manpower that are capable of managing, monitoring, maintaining, and adapting the imported technology to suit local environment. In this paper, **I present some of the empirical results and observations which describe the interactions between the supplier of technology (Internet Works and Communications System) and the recipient of the technology (PAAE&T) in the field of technology transfer**. In other word, whether the PAAE&T have taken the opportunity, while building its new headquarter, in the transfer of technology from the supplier of internet works and communications system to its academic staff in the various computer and communication academic departments at the PAAE&T colleges and institutions. The paper argues that, for effective and efficient transfer of technology, the recipient (PAAE&T) must ensure that the agreement with the supplier of Internet Works and Communications System must include calluses that would allow the PAAE&T academic staff in its various computer and communications academic departments in its various colleges and institutions to acquire the technology embedded in the agreement. The paper concludes that the transfer of technology and the building of a local scientific and technical infrastructure must be viewed by Kuwaiti decision-makers as a complementary to one another. Thus, reducing, to great extent, the level of dependence on expatriate, particularly in essential sector of the economy (e.g., oil, electricity and water, health).

Keywords. Technology Transfer, developing Indigenous Manpower,Internet & communications technology, Kuwait

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1. Introduction:

The transfer of technology has taken place throughout history, in its most traditional forms through conquests, migration, travel, and trading. The terminology "Technology Transfer" originated in the United States, where the Federal Government has been responsible since 1940 for directing a steadily increasing shares of national research and development resources, primarily towards military, space and atomic energy goals. Similarly, many developing countries appear to favor technology transfer in order to develop in a much shorter time than it took to develop the original technology. The fact is, that the phenomenon of technology transfer has existed ever since the beginning of technological process. Having significantly increased in recent years, it will probably attract the world's attention for many years to come. Technology can be defined as a "method of doing something". To use a method, there are three significant requirements-information about the method, the means of carrying it out, and some understanding of the method. For technology to be properly understood or absorbed, the suppliers must provide all of these elements either explicitly or implicitly. These elements may be embodied in physical goods and personnel, or they may be disembodied, in the form of process technology, drawings etc. Webster Dictionary provided two distinguished definitions of technology. The essential meaning of technology viewed as "the use of science in industry, engineering, etc., to invent useful things or to solve problems", and the full definition of technology and perceived as "the practical application of knowledge especially in particular area". (Webster Dictionary, 1828) On the other hand, emerging technology can be viewed as the current technology that can be applied in various sectors such as: health, defense, education, construction, industry, business, oil, and electricity and water. Technology, in most cases, have a positive impact on business, industries, education, health, electricity and water, security, reducing unemployment rate, reducing crime rate, and enhancing the living standard of people. In fact, the role of technology on business and industries cannot be overstated. Technology is considered as a significant precondition for improving productivity, attaining, industrial advancement, and enhancing export growth. (Lakhera, 2016) In business perspective, technology would encourage a team work approach in a more effective and efficient manner and solve employees' differences and conflicts. In industrial point of view, technology would improve productivity, enhancing workers knowledge and skills, improving industrial image, lower cost rate, lower unemployment rate particularly between youth, increasing profits, enhancing creativity, and enhancing society living standard. Technology can increase quality of product throughout all stages of the manufacturing process, improving the efficiency of the plant, reduction of material wastages, and enhancing effective communications (The Manufacturer, 2017). In recent research showed that students use information technology effectively. Over 80% of students use the internet and benefit from its many advantages, especially in obtaining new information, data, and communicating with people. On the other hand, information technology hurts concentration in class and consumes a significant amount of time. (Zamira, 2020) technology can have other disadvantages such as: data security, complexity, crime and terrorism, work overload, addiction, plagiarism and copyright, (Paul, 2018)

Technology transfer is currently used as a blanket term to cover a wide range of activities, which include information flow from laboratory throughout various appropriate departments in a firm for different applications. These include production, marketing and diffusion of innovation, the shift of knowledge, from production-oriented to application-oriented institutions, the application of a technology for a purpose other than the one for which it was designed, the license or sale of technology produced in the industrialized nations to

others, and generally speaking, the process by which science and technology are diffused throughout human activity. Therefrom, there is

no tightly-controlled definition of the concept of technology transfer in the related literature. However, some commonality can be identified when the transfer is viewed as an innovation process by which an idea, practice, or objective is applied for the first time by an individual or institution. The process of technology transfer can be described in the simplest of terms as encompassing three stages. First, the technology must have a source. Second, the technology must be produced or manufactured. Finally, the technology must be applied or used in some social or economically profitable way, such as in the production of water, electricity., gas, medical, or oil technology. In all these cases, a movement or transfer must occur from one function to another, from industry to industry, or from nation to nation. Others perceived technology transfer as the process of converting outcomes stemming from scientific and technical research to the market place and the society, along with associated knowledge, skills, and procedures, and is as such an intrinsic of the technology innovation process or procedures. Technology transfer covers the complex value chain of research and development to its inevitable society (European Commission, 2020) The technology transfer process is guided by policies, procedures, rules, and values of each firm involve in the process. (TWI, 2020) technology transfer in the context of research institutions, can be defined as the process by which new inventions or innovations generated in a specific institution's lab are converted into products and commercialized. This can be accomplished through licensing patented intellectual property to companies. (Technology Transfer Central, 2021) In fact, it is considered as the ultimate objective of all transportation research. It is the process by which current or newly acquired knowledge, facilities, or capabilities generated under the umbrella of federal research and development (R&D) funding, are shared and transferred towards the commercial marketplace to respond to the public and private needs and requirements. (U.S. Department of Transportation, 2018) There are different types of technology transfer, which can be classified into vertical technology transfer (the transfer from basic research into applied research) and horizontal technology transfer (when technology has already been placed or applied withing one firm is further transferred and applied by another firm). Technology transfer can be transferred as scientific dissemination, direct application, commercial transfer, and imported resources. (U.S. Department of Transportation, 2018) Technology transfer consist of the following's steps; identifying the actual needs of technology, identification of the type of technology, choosing the appropriate technology, transferring and possible adaptation of technology, and assessment of the outcomes of the imported technology. Technology can be transferred internationally, reginal transfer, cross industry, inter firm technology transfer, and intra firm technology transfer. (Sudha, et. al., 2018) Technology can be transfer through general channels (e.g., education, training, conferences), and formal channels (e.g., licensing, franchise, joint venture, turn key project, foreign direct investment. (Tarek, 2016) Many developing countries now appear to be seeking technological process through technology transfer to realize development in a much shorter time that that required originally by developed countries. Technology transfer is perceived as a significant element enabling developing countries to integrate into and compete in the international economy as well as meeting their advancement objectives. (Gupta, 2016) In addition to, achieving three significant objectives: introduction of new techniques through investing un developing plants; improving the existing techniques; and generating of new knowledge. (Catsambas, 2016) Developing countries interest is focusing on obtaining the know-how and know-why to improve the living standard, increase wages, reduce the rate of unemployment, tackling crimes rates, introduce more jobs and work opportunities, improve the standard of education and training, encourage giftedness and creativity skills,

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saving water and energy consumptions, and enhancing the ability to adapt and maintain the imported technology to suit local environment requirements. However, developed countries have a completely different interest, procedures, methods, and rules to restrict the distribution of technology and protecting the know-how and know-why for their interests. This was worsening by the lack of knowledge and skills in understanding and interpreting technology transfer agreements which, in most cases, include cluses that impose a clear and hidden restrictions and cost that would handicaps the ultimate use of technology to serve the needs of developing countries. As well as, a visible and hidden cost that would place a heavy burden on the shoulders of decision makers in some developing countries.

The gulf states governments acknowledge the need to equipped indigenous manpower with the necessary knowledge, skills and attitude to enable them to work in local industries and business. The dependence rate on expatriates in the gulf states is high particularly in essential sector of their economy (e.g., oil and electricity and eater, health sector, infrastructure). The United Arab Emirates (UAE), like most of the gulf states relay heavily on expatriates' manpower (nearly 90% of the population), in the Kingdom of Saudi Arabia, it is estimated that expat constitute over 10 million out of its population, and half in Oman and Bahrain. (Sabena, 2020) The current population of Kuwait in 2021 is 4,328,550 a 1.36% increase from 2020. Expatriates account for about 70% of Kuwaiti population, among which 1.1 million Arab expatriates and 1.4 million Asian expatriates. (World Population Review, 2021) Due to the outbreak of Covid 19 pandemic and its impact on jobs declines, the employment level would expect to fall by at least 13%. For instance, in the Kingdom of Saudi Arabia, 1.2 million expats forecast to leave this year, and Kuwait planning to reduce expat numbers to 30% from its current 70% of the total populace. (Christopher, 2020) Decision makers in the gulf states have realized the urgent need to enhance indigenous capabilities by setting a plan to promote the availability of indigenous capabilities able to adapt, maintain, and manage the imported technology apply in local industries and business. Therefore, attention was diverted into technical and vocational education to respond to the need on skilled and semi-skilled national manpower particularly in essential sectors of the gulf states economy (e.g., oil and electricity and water, health sector, infrastructure). However, the success of technical and vocational education would depend on the management sincere willingness to tackle any ethical misconduct that might have a negative implication not only on learning and teaching but also on the reputation of the institution.

Kuwait, a developing country, has high economic potential as a result of its oil resources. It has also been undergoing a process of technology transfer for about the last decades.

Kuwaiti key figures have also appreciated the curial role of technical and vocational institutions in providing essential sectors of the economy with the skilled and semi-skilled indigenous manpower in order to reduce, to great extent, the dependence on expatriates. The Kuwaiti government has forged the Public Authority for Applied Education and Training, PAAE&T, in 1982 to respond to the urgent of essential sectors of the economy from semi and skilled indigenous manpower. The PAAE&T aims include interaction with major institutions in the labour market, training national manpower, joint research with local industries, and linking programs to society's needs and requirements. In another word, the Kuwaiti government attention is not only to prepare students to the world of work but also to closing the gap between technical and vocational institutions and local industries. The PAAE&T has five colleges and eight training centers. The aim of the PAAE&T is to "**to provide the national technical workforce that meets the requirements of social and economic development in terms of quantity and quality… and taking into account the general indicators of the needs of the labor market and the variables it carries that govern the labor market needs of graduates**

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of applied colleges and training institutes". (The PAAE&T Website) The research examines whether the management of the PAAE&T has invested the opportunity in building its head quarter building which cost around 63 million Kuwait Dinar equal to approximately 190 million USA dollars, in the transfer of technology to its academic staff at computers and communications academic departments in its various colleges and institutions. (Al-Anbah New Paper, 2021) In other word, whether the management of the PAAE&T has allowed and encouraged those who are specialized in computers inter-networks and communications in its computers and communications academic departments in its various colleges and institutions to gain the know-how and know-why embedded in imported technology. It hopes that the results of this research would guide the management of the PAAE&T in setting and implementing a proper and efficient plan that ensure the technology transfer agreement include clauses that enable its staff in its computers and communications academic departments in its various colleges and institutions to interact positively with the supplier of technology. Indeed, this would have a significant implication of the reduction of the level of dependance on expatriates and the enhancement of local capabilities in the area of computers and communications system.

2. Research Objectives:

The research examines whether the management of the PAAE&T has invested the opportunity in building its head quarter building which cost around 63 million Kuwait Dinar equal to approximately 190 million USA dollars, in the transfer of technology to its academic staff at computers and communications academic departments in its various colleges and institutions. In other word, whether the management of the PAAE&T has allowed and encouraged those who are specialized in computers and communications system in its academic departments in its various colleges and institutions to gain the know-how and know-why embedded in imported technology. It hopes that the results of this research would guide the management of the PAAE&T in setting and implementing a proper and efficient plan that ensure the technology transfer agreement include clauses that enable its staff in its computers and communications academic departments in its various colleges and institutions to interact positively with the supplier of technology. This would have a significant contribution in the reduction of the level of Kuwait's dependence on expatiates, particularly in essential sector of the economy (e.g., oil, electricity and water, health)

4. Materials and Methods

4.1 Design

This research consisted of a descriptive survey designed to identify and examine the type of interactions between the Public Authority for Applied Education and Training, PAAE&T, and the supplier of technology (**Internet Works and Communications System)** while building its new headquarter. The PAAE&T has five colleges and eight training centers. They are namely: Faculty of Basic Education, Faculty of Business Studies, **College of Technological Studies, College of Health Sciences, College of Nursing, the Institute of Nursing, Higher Institute of Communications and Navigations, the Higher Institute of Energy, the** Sabah Al-Salem Industrial Institute, and Shuwaikh Industrial Institute, Structural Training Institute, Vocational Training Institute, and Higher Institute of Administrative Services. **The research examines whether the management of the PAAE&T has invested the opportunity in building its head quarter building which cost around 63 million Kuwait Dinar equal to approximately 190 million USA dollars, in the transfer of technology to its academic staff at computers and communications academic departments in its various**

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colleges and institutions. In other word, whether the management of the PAAE&T has allowed and encouraged those who are specialized in computers internet works and communications system in its computers and communications academic departments in its various colleges and institutions to gain the know-how and know-why embedded in imported technology.

4.2 Sample

The research encompassed interviews with (2) heads and senior engineers representing the supplier of technology (**Internet Works and Communications System).** The recipient of the Inter Networks Company is the PAAE&T which has five colleges and eight training centers. They are namely: Faculty of Basic Education, Faculty of Business Studies, **College of Technological Studies, College of Health Sciences, College of Nursing, the Institute of Nursing, Higher Institute of Communications and Navigations, the Higher Institute of Energy, the** Sabah Al-Salem Industrial Institute, and Shuwaikh Industrial Institute, Structural Training Institute, Vocational Training Institute, and Higher Institute of Administrative Services. **The aim is to examines whether the management of the PAAE&T has invested the opportunity in building its head quarter building which cost around 63 million Kuwait Dinar equal to approximately 190 million USA dollars, in the transfer of technology to its academic staff at computers and communications academic departments in its various colleges and institutions. In other word, whether the management of the PAAE&T has allowed and encouraged those who are specialized in computers and communications system in its academic departments in various colleges and institutions to gain the know-how and know-why embedded in imported technology.**

4.3 Instrumentation

The target population for this research consists of interviews with (2) heads and senior engineers representing the supplier of technology (**Internet Works and Communications System).** The recipient of the internet works and communications system is the PAAE&T, which has five colleges and eight training centers. They are namely: Faculty of Basic Education, Faculty of Business Studies, **College of Technological Studies, College of Health Sciences, College of Nursing, the Institute of Nursing, Higher Institute of Communications and Navigations, the Higher Institute of Energy, the** Sabah Al-Salem Industrial Institute, and Shuwaikh Industrial Institute, Structural Training Institute, Vocational Training Institute, and Higher Institute of Administrative Services.

4.4 Statistics and Parameters

The statistics pertain to the sample. The parameters pertain to an entire population.

4.5 The research parameters/sample are as follows:

a) Interviews were conducted with (2) heads and senior engineers representing the supplier of technology (**Internet Works and Communications Systems).**

b) **The selected colleges and institutions at the PAAE&T are:** Faculty of Basic Education,

Faculty of Business Studies, **College of Technological Studies, College of Health Sciences, College of Nursing, the Institute of Nursing, Higher Institute of Communications and Navigations, the Higher Institute of Energy, the** Sabah Al-Salem Industrial Institute, and Shuwaikh Industrial Institute, Structural Training Institute, Vocational Training Institute, and Higher Institute of Administrative Services.

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5. Research Findings:

5.1 The Characteristic of the Research Sample.

Interviews were conducted with (2) heads and senior engineers representing the supplier of technology (**Internet Works and Communications System). The aim is to examines whether the management of the PAAE&T has invested the opportunity in building its head quarter building which cost around 63 million Kuwait Dinar equal to approximately 190 million USA dollars, in the transfer of technology to its academic staff at computers and communications academic departments in its various colleges and institutions. In other word, whether the management of the PAAE&T has allowed and encouraged those who are specialized in computers and communications in its academic departments in its various colleges and institutions to gain the know-how and know-why embedded in imported technology.**

5.2 Measuring the level of collaboration between the supplier of technology (Internet Works and Communications System and the recipient PAAE&T.

The interaction between technical and vocational education and industries and business is highly in the related literature. (Michael, et. al., 2021, Martin et. al., 2021, Junmin, et.al., 2021) The collaboration between the PAAE&T and the provider of technology (**Internet Works and Communications System**). Indeed, the collaboration between both parties would indeed enhance the quality of the PAAE&T graduates. In addition to, improving the quality of the PAAE&T curriculum, laboratories and workshops, safety and health procedures and rules, field training program, students' evaluation scheme, and implementing joint committee. Technical and Vocational education provides employers with skilled and semi-skilled manpower at the same time reducing the rate of unemployment specially among young generation. The rapid advancement of science and technology, particularly in production techniques and methods force technical and vocational education institutions to apply new learning and teaching techniques to respond to industrial needs and business requirements. On other hand, industries and business have to strengthen their relationship with technical and vocational education institutions in order to close the gap and thus enhance students and graduates' competencies in various field of production methods and techniques. The dynamics of relationship between technical and vocational education institutions and industries and business is highly stressed in related literature. (OECD, 2018, Australian Government Productivity Commission, 2021, Triki, 2008, Yorke and Knight, 2019) The contribution of a strong linkage between technical and vocational education and local industries and business is manifest itself in reducing rate of unemployment, particularly in youth unemployment (Simone, 2020), enhancing students' knowledge and skills (The World Bank, 2017), and strengthening teachers' competencies and personality (OECD, 2021, Gabriela, 2016), reviewing and monitoring curriculum to respond to industrial needs (Bohmann, 2007), forming proper policy and strategy for future manpower needs analysis (Khawla 2011, Ministry of Education and Sports, 2019), enhancing and upgrading the learning process to be compatible with industrial requirements (OECD, 2021), and maintaining a strong partnership for ensuring a continuing future successful collaboration (Florinda, 2021). An effort has been exerted to interview (2) heads and senior engineers representing the supplier of technology (**Internet Works and Communications System). The aim is to examines whether the management of the PAAE&T has invested the opportunity in building its head quarter building which cost around 63 million Kuwait Dinar equal to approximately 190 million USA dollars, in the transfer of technology to its academic staff at computers and communications academic departments in its various colleges and institutions. In other word, whether the**

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management of the PAAE&T has allowed and encouraged those who are specialized in computers and communications system in its academic departments in its various colleges and institutions to gain the know-how and know-why embedded in imported technology. The types of collaboration between both parties are revealed below.

Identifying whether the academic staff at computer and communications system departments at the PAAE&T in its various colleges and institutions received the know-how and know-how embedded in the Internet works and Communications Technology.

Have the Academic Staff in Computer & Communications Academic Departments in various College and Institutions at the PAAE&T Participated with the Supplier of Internet works and Communications Technology in the Installing of the followings Tasks:	*Yes*	No
Analyzing building layout for studying and examining the efficiency of networks wavers traveling throughout the whole new building.		**X**
Analyzing and examining the new building materials for possible barriers to obtain a maximum efficiency of networks.		**X**
Analyzing and examining possible networks barriers inside the new building.		**X**
Installing networks devices, routers, server, and other related networks apparatus.		**X**
Installing of wires and cables suitable for networks efficiency.		**X**
Installing of networks sockers and electrical switches.		**X**
Installing of cabinets server NVR.		**X**
Installing of security cameras.		**X**
Installing of data control panels.		**X**
Installing of single mode fiber optic users.		**X**
Identifying and fixing networks problems.		**X**
Identifying and examining possible overload usage of networks capabilities.		**X**
Installing PVC pipes.		**X**
Installing trunks & cables.		**X**
Installing of patch cabinets.		**X**
Installing of active switch technology.		**X**
Installing of CCTV cameras.		**X**
Installing data sockets.		**X**
Installing cable tray.		**X**

The above (approximate responds) is obtained from A Deputy Manager of Internet Works and Communications System.

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The role of Inter works and communications system is highly notable in our life. In fact, it can facilitate the communications with person, people, society, nations, and even space. As a society we need to communicate and share information, data, feeling, solving personal and technical problems, exchange of thoughts and feelings, strengthening family relationship, reducing crimes, lowering rate of poverty, reducing unemployment rate, tackling diseases, and improving living standard. Designing a new building is an art that requires careful and professional touch to save energy, economical electricity and water consumption, allowing free movement of employees and customers, using safe and healthy building materials, easy access to emergency entrance and exist, and access to a professional internet network and communications system. In business and industries perspective, internet works and communications system would allow efficient and effective communication with employees, managers, consumers, increasing producing, allowing diversity in production techniques and methods, solving employees and consumer problem, tackling technical problems, enhancing storing and material handling, maintaining a safe and healthy working environment, facilitating the implementation of education and training sessions, and allowing free emergency scape. The designing of a smart internet works and communications system require a smart building design to allow free access to internet works without any barriers or obstacles. Consequently, this would reduce the level of stress and anxiety that might employees faced when they encounter slow and inefficient access to information and data. Therefore, internet works and communications engineers are strongly advice to work jointly with the architectural engineering from the early stage of designing and building to ensure the designing and implementation of a smart building that would not only safe energy and protect the environment, but also in allowing a free movement of internet waves to cover all building spaces without any barriers. The interaction between the supplier of internet works and communications technology and the recipient of technology (the academic staff working at the computer and communications department at various colleges and institutions at the PAAE&T), would facilitate the transfer of know-how and know-why among academic staff. Regrettably, no concrete evidence has been allocated to confirm the participation of academic staff at computer and communications academic departments at various colleges and institutions at the PAAE&T in the designing, selecting of devices and monitors, implementing the internet works and communications system project, monitoring and assessing the quality of internet works and communications system in the new PAA&T headquarter building which cost approximately **63 million Kuwait Dinar equal to approximately 190 million USA dollars. It is worth mentioning that, the only department who was actively involved with the supplier of internet works and communications technology was the Engineering Department at the PAAE&T who play a vital role in determining the internet works and communications specification system, devices, monitors, servers, types of data cables, switches, types of cabinets panels, types of writing, and others related inter works and communications apparatus. However, their role was to design, supervise, assess, follow, and ensure whether the supplier of internet works and communications system provided and install all the items and specifications that are listed in the agreement. When asked if the Engineering Department staff at the PAAE&T involve in the installation of all items related to the agreements such as: participating in fitting wires, cable, cabins, devices, monitors, switches, and others. The answer was unclear. However, the supplier of internet works and communications system confirm to the author that they have conducting a training program to the Engineering Department staff at the PAAE&T. An attempt was made possible to investigate whether the PAAE&T included a transfer of technology calluses in the agreement that would allow the transfer of know-how and know-why to their academic staff at its various computer**

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and communications academic departments in its various colleges and institutions, and the answer was unfortunately "not specified".

6. Summary & Conclusions.

In technical and vocational education perspective, technology transfer is considered as a "golden" opportunity for not only academic staff but also for students to gain the right knowledge, skills, and attitude that are mostly needed by related industries and business. It is the open "gate" to the know-how and know-why embedded in the imported technology. It is considered the real transformation of theory into practice in which academic staff would be experience the real and truly working environment of all issues related to their specialty. Indeed, academic staff would be able to positively and effectively interact with the supplier of internet works and communications technology in a manner that they have not been experience during their teaching career. However, the interaction of academic staff with the supplier of internet works and communications technology would not be achieved unless the management of the PAAE&T recognized and appreciate the role of technology transfer in technical and vocational education. In other word, there have to be a clear and precise philosophy that would allow not only the engineering department staff at the PAAE&T to involve in technology transfer, but also allowing the opportunity for academic staff in its various colleges and institutions to work jointly with the supplier of internet works and communications system. The fact is that, excluding academic staff from technology transfer in the field of internet works and communications system would have a negative implication not only on the standard of academic staff but also on the quality of graduates. The new building of the PAAE&T which is cost millions of USA dollars, must be viewed by the management of the PAAE&T as a real "training center" or a real "workshop" that academic staff and students would learn and practice all issues related to their field of specialty. Among which academic staff as well as students can learn and practice the technology used in determine floor design requirements, the types of building materials that might obstruct the optimal usage of internet work waves and communications system, the types of walls and partitions that might form as a barrier for effective internet works and communications efficiency, the methods used to measure the high of celling and the route of internet works and communications waves, the types of deceives and servers and the techniques applied for installation, the design of the building floor, the methods of fitting NVR server cabinets, the types of data wiring and cabling and the way of installing, the types and methods of installing data sockets, the advantages of using viper optic users, types of security camera, CCTV cameras and the criteria for selected the right positions and distance, types of UPVC pipes, and other aspects related to the internet works and communications technology. Indeed, this is the real technology transfer process in technical and vocational arena. It hopes that, the findings of this research would provide a true and sincere awareness to the fact that technical and vocational education and technology transfer must be viewed as a complementary each to other. The management of the PAAE&T must stress, without any hesitation, that future agreements must include calluses that would permit academic staff in computers and communications department to effectively involve in the process of technology transfer. This would imply that; academic staff would need to break the "black book" and work jointly and freely with the supplier of technology so that "real" quality is achieved and maintained in technical and vocational education. Otherwise, Kuwait would continue to rely on expatriates for years ahead.

References

[1] Australian Government Productivity Commission, (2021), "5 Vocational Education and Training", Report on Government Services: 2021.
[2] Al-Anbah New Paper, (2021), "The Public Authority for Applied Education and Training new headquarter building cost", Issue 16286, September 2021
[3] Bohmann, L. Sorby S. Johnson D. Mattila K., and Sutherland, J. (2007), "A Model Curriculum for service systems engineering" . American Society for Engineering Education.
[4] Catsambas, T.T., (2016), "Facilitating evaluation to lead meaningful change", New Directions for Evaluation, Vol. 2016, No. 149, pp.19-29.
[5] Christopher Copper, (2020), "1.2 million expats forecast to leave Saudi Arabia this year", 19 June 2020, International Investment. https://worldpopulationreview.com/countries/kuwait-population
[6] European Commission, (2020), "What is technology transfer?" Competences Centre on Technology Transfer, 2020. https://knowledge4policy.ec.europa.eu/technology-transfer/what-technology-transfer_en
[7] Education (India) Pvt Ltd, 2nd edition, 2016, p 372- 380.
[8] Florinda Sauli, (2021), "The collaboration between Swiss initial vocational education and training partners: perceptions of apprentices, teachers, and in-company trainers", Empirical Research in Vocational Education and Training, 13, Article number: 10 (2021). https://ervet-journal.springeropen.com/articles/10.1186/s40461-021-00114-2
[9] Gabriela Gabrhelova, (2016), "Teachers in the Context of Vocational Education", Acta Technologica Dubnicae volume 6, 2016, issue 3. DOI: 10.1515/atd-2016-0022
[10] Gupta, J., (2016), "'Climate change governance: history, future, and triple-loop learning?', Wiley Interdisciplinary Reviews: Climate Change, Vol. 7, No. 2, pp.192-210.
[11] Junmin Li & Matthias Pilz, (2021), "International transfer of vocational education and training: a literature review", Journal of Vocational Education & Training, 28 January, 2021.
[12] Khawla Shakhshir Sabri, (2011), "Vocational education policies and strategies as perceived by palestinian academics and technicians", Research in Post-Compulsory Education, 2:2, 205-215, DOI: 10.1080/13596749700200011
[13] Lakhera, M.L., (2016), "Manufacturing: Diversification and Sophistication", in Economic Growth in Developing Countries (pp. 97-131). Palgrave Macmillan UK.
[14] Martin Donani, Rhoda Saan, Frederick Kuuyine, Yunus Adams, (2021), "An empirical study discussing industrialization and technical education in Ghana", International Journal of Vocational and Technical Education, Vol. 13 (1), pp.1-12, September 2021.
[15] Ministry of Education and Sports, (2019), "The Technical Vocational Education and Training (TVET) Policy". Republic of Uganda. 2020.
[16] Michael Roll & Dirk Ifenthaler, (2021), "Learning factories 4.0 in technical vocational schools: can they foster competence development?", Empirical Research in Vocational Education and Training 13, Article Number: 20 (2021).
[17] OECD, (2018), "Education at Glance", OECD Indicators. Paris OECD Publishing.
[18] OECD, (2021), "OECD reviews of vocational education and training" OECD Library, 2021.
[19] OECD, (2021), "Teachers and Leaders in Vocational Education and Training", OCED Reviews of Vocational Education and Training, report Summary, 2021.

https://www.oecd.org/skills/centre-for-skills/Teachers-and-leaders-in-VET-report-summary.pdf
[20] Paul Goodman, (2018), "17 Disadvantages of digital technology", Turbo Future, 2018.
[21] Sabena Siddiqui, (2020), "GCC faces possible setback with exodus of skilled professionals", Al-Monitor, June 22, 2020. https://www.al-monitor.com/originals/2020/06/gulf-state-gcc-exodus-saudi-arabia-wokers-uae-kuwait.html
[22] Simone R. Haasler, (2020), "The German System of Vocational Education and Training: Challenge of gender, Academization and the Integration of Low-Achieving Youth", Transfer: European review of Labour and Research, February 12, 2020. https://doi.org/10.1177/1024258919898115
[23] Sudha, Rani, Madhusudan, Rao, Prahlada Ramarao, Sunil Kumar, (2018), "Technology transfer-models and mechanisms", International Journal of Mechanical Engineering and
[24] The PAAE&T Website. https://e.paaet.edu.kw/AR/Pages/default.aspx
[25] Tarek Khalil & Ravi Shankar, (2016), "Management of Technology", McGraw Hill
[26] Triki, (2008), "A Critical Evaluation of Vocational Education and Requirement for Libyan Manufacturing Industry".
[27] The Welding Institute, (2020), "What is technology transfer, definition and examples", TWI Innovation Network, 2020. https://www.twi-global.com/technical-knowledge/faqs/what-is-technology-transfer#Conclusion
[28] The Manufacturer, (2017), "Using technology to improve your manufacturing processes", August, 2017.https://www.themanufacturer.com/articles/using-technology-improve-manufacturing-processes/
[29] Technology Transfer Central, (2021), "What is technology transfer", Technology Transfer Tactics, September 16, 2021. https://techtransfercentral.com/online-resources/
[30] The World Bank, (2016), "Enhancing Employability", report prepared for the G20 Employment Working Group", 2016.
[31] Technology (IJMET), Volume 9, Issue 6, June 2018, pp.971-982. Winston and Strawn, (2020), "What is the definition of emerging technology?", Winston & Straw LLP., 2020. https://www.winston.com/en/legal-glossary/emerging-technology.html
[32] U.S. Department of Transportation, (2018), "Forms of technology transfer", September 21, 2018. https://www.transportation.gov/research-and-technology/transportation-technology/tech-transfer/forms-of-tech-transfer
[33] Webster Dictionary, 1828
[34] Yorke, M. and Knight, P.T. (2006), "Embedding employability into the curriculum. Learning and Employability", Series 1 No. 3. Higher Education Academy. Available from: https://www.heacademy.ac.uk/knowledge-hub/embeddingemployability-curriculum (February, 25th, 2019)
[35] World Population Review, (2020), Worldometer, 2020. https://www.worldometers.info/world-population/kuwait-population/
[36] Zamira Gashi Shatri, (2020), "Advantages and Disadvantages of Using Information Technology in Learning Process of Students", Journal of Turkish Science Education, Volume 17, Issue 3, September 2020.