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Article:	**National Innovation System and Curriculum Development in Business Education Incorporating Technology & Innovation Management Systems**
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ABSTRACT

Malcom X said, "*And just because you have colleges and universities, doesn't mean you have education*". Higher Education Institutions (HEIs) in Pakistan suffer from several systemic deficiencies. As a result, it continues to provide graduates that are unemployable, despite emerging shortages of skilled manpower in an increasing number of sectors. Specifically, the unemployment rate of business graduates is alarming. Adoption of technology and ICT tools in higher education is an essential component of andragogy – the motivation to innovate is also fundamentally linked to the cultural influences on higher education. National Innovation System (NIS) links together the public, private and academic sector and utilizing NIS to facilitate the cultural innovation in education would ensure a stable economic growth. The changing state of the financial crises and the post-pandemic world begs the educational landscape to employ innovative solutions and make use of intellectual capital to ensure that graduates have the skills and resources necessary to enter their careers. Research-based education in business schools in Pakistan has the potential to achieve a higher standard of scholarship stemming from national level issues but lack of funding and motivation to compete with globalization may deter these efforts. The largest factor in achieving Technology and Innovation Management (TIM) is applying ICT and Instructional Design (ID) tools to innovate and stay in competition with the andragogic challenges of the post-pandemic world.

Key words: National Innovation System (NIS), Education Tools, ICT in education, Innovation Management, Tertiary Business education, Knowledge economies, Intellectual Capital, Instructional Design, Andragogy

Introduction:

The biggest challenge of globalization perhaps is the shift of viewing 'assets' from labor or machinery (traditional economic model) to 'innovation' in the new evolving economic model that focuses on the knowledge economy and information age (Efrat, 2014). The inevitable product of globalization and knowledge economy is the multi-national enterprises (MNEs) offering similar services and technology across nations, prompting a swift adoption of technological based products across the globe (Freeman, 1995). But there is strong evidence of diffusion of MNEs operation and diversification (Tihanyi, Griffith, & Russell, 2005) hampered by cultural aspects of the host country (Dwyer, Mesak, & Hsu, 2005; Hofstede, 1994).

Therefore, adoption of technology and technological-based products and the motivation to innovate is directly linked to culture at the national level (Lundvall, 2007). The concept of national innovation system (NIS) dates back to the 19th century but the contemporary definition of NIS stresses the nexus of linkage and collaborations between Public (agencies and Government offices), Private (national firms and enterprises) and Academia sector (Etzkowitz & Leydesdorff, 2000). In a research study, Fagerberg & Srholec (2008) asserted that countries with stable NIS shows higher economic growth than their counterparts with dysfunctional or non- existing NIS. Functional NIS is directly linked to the ability to innovate at national level. They further elaborated in their results, that the concept of NIS is embedded with other important constructs like political systems and government openness. They suggest trust, level of corruption, civic rights, form of governance, and education are the main determinants of innovation at the national level.

The global financial crisis has led to seek innovative solutions and considers Intellectual capital as the main strength of modern economies (Jaffe & Trajtenberg, 2005). Education is the key for development for any country; and is the most effective means to overcome inequality, eradicate poverty and achieve development (Sayed, 2013). The research and innovation activities of higher educational institutes (HEI's) emulate the foundation and progress of knowledge economies of a region (Muresan & Gogu, 2012). NIS is established after research on relevant sectors has pointed to some solutions to foster innovation and that research sprouts from HEIs. This linear process ends when it is embedded in social and economic institutions (Wiseman & Anderson, 2012). Therefore, HEIs in Pakistan have yet to play their part in generating requisite research to establish NIS. A deliberate effort, attention and resources need to be dedicated to encourage researchers to engage in establishing NIS in this region. As Wiseman & Anderson (2012) put it, *"…national education systems serve as national innovation incubators because they create knowledge economy structures, processes, content, and productivity through formal schooling*".

McGrath (2014) wrote, "*As the end date for the Millennium Development Goals approaches so the focus on goals, visions and policies for development after 2015 becomes ever heightened. However, there has been relatively little engagement by educational research community in these debates*". Hulme & Wilkinson (2012) stressed on the need of national discussions to seek evidence regarding national plans, policies, budget making and

implementation in post-2015 vision especially for education. There has been a lot of emphasis in recent research concluding that there is a dire need of interdisciplinary dialogues. Academia proves that early childhood development leading up to getting the requisite professional education and enhancing research building capacity of institutions (specifically tertiary institutions) - that should be the hub of research for policy making (McGrath, 2014).

Innovation issues in Tertiary Business Institutes

The main factor to facilitate innovation like new e-learning tools in tertiary education is the '*investment*' - albeit culture plays an important role to motivate the innovation initiatives (Efrat, 2014). Venture capitalists (VCs) in the field of educational tools still fail to get the grants from professional Vice Chancellors' of the universities due to financial constraints (Foraya & Raffo, 2014). There are few business incubation centers across universities in Pakistan, and those too rely on hard model of investment, i.e. they call MNEs and large enterprises to come and provide funding as per their requirements and policies, whereas the need is to encourage the soft investment model, where innovation and technological ideas that come from fresh talented minds are provided a platform and the university plays the role of connecting innovators with financers. Unique ideas and innovative solutions die a natural death because of lack of financial support from the universities.

Currently, there are about 180 business schools in Pakistan claiming to emphasize research-based curricula. There are many incentives for the faculty to get published in impact factor journals, but the priority to address our grassroots level internal issues remains a big question mark (NBEAC, 2016). All the research in form of thesis and independent research studies does not find its way out of university libraries to the relevant sectors. If faculty promotion and honorarium criteria rewards impact factors and international issues, then the national issues are bound to take the back seat. Consequentially, if we want policies to be generated from meaningful research, we need to reward and encourage faculty and students, specifically in tertiary business institutions, to focus on internal issues for local entrepreneurship, industry, agriculture, environment etc. The modern enterprises expect a certain skill set from business graduates regarding international exposure. Therefore, business schools cannot simply achieve globalization by attracting multinational students or teaching in English, rather it is a slow process - a learned trend that emerges from research and experience of international business schools with all stakeholders on board (Terrasse, 2016).

The globalization and standardized product and services of MNEs across nations has made it obligatory for nations to participate in a common community (Law & Pan, 2009). The internationalization challenges specifically for business schools could be met by encouraging venture capitalist/investors in educational tools industry and patronage of Public/private partnership for Universities capacity building. Millennium Development Goals (MDG) and post-2015 progress in educational development needs to involve the leadership at every institutional level to align to the world wide debate for post-2015 (after MDG).

A study in India on alleviation of the paradox of shortage of skilled labor in industry and high rate of unemployed graduates suggested a tight academia-industry link - especially in

tertiary education. A concerted effort for syllabus development in tertiary education is required, so that timely industry-specific required skills can be taught (Menon, Tiwari, Chhabra, & Singhd, 2014). Investment in teachers training and development through effective use of information and computer technologies (ICTs) will create NIS and enhance research capacity of the institutions (Wiseman & Anderson, 2012). Inter-university resource sharing at national and international levels needs to be established.

In developed nations, the research and innovation activities in HEIs are providing solutions in the technological and socioeconomic domains leading to sustainable development (Muresana & Gogu, 2012). Like European Research Area (ERA) and the European Higher Education Area (EHEA), we need to collaborate internationally to establish a wide academic framework that would generate research and innovation activities suitable for our national and regional needs and forecast requirements of development skills in the required area. The EU consensus for 2020 estimated that 85% of jobs require high or medium level skills and there is a reduction for the low-qualified by 15%, moreover, about 40% of the EU's young adults (30-34 years) require a tertiary level education (European Commission, 2011).

Technology and Innovation Management

It is essential to realize that the HEI's subcultures of 'academics' and 'technologist' needs to have a concomitant fit as they have an integrative effect in adopting software decisions; besides this, progress in educational tools & technology investment needs would continue to dominate in future (Rooij, 2011). The technology and innovation management (TIM) is important in tertiary institutes from the strategic point of view, and points towards the gap in perceived importance by its stakeholders and the graduate level curriculum of TIM (Yanez, Khalil, & Walsh, 2010). To expedite progress in educational tool industries, the public sector's management, governance and culture should be taken in account.

Seymour (1999) predicted that the traditional school system will not exist after the progress in ICT, pointing towards the innovation failure/deficit in incorporating technologies in educational structures. This neglect in treating education as science and linking it to practice is hampering the supply and distorting the demand of education research.

One of the widespread impacts that shortly followed the COVID crisis was the complete reconstruction of our conventional mode of education and a dramatic change in our education field (Blundell et al. 2020). A consistency of learning was required to be ensured by government policymakers considering how the pandemic affected all tiers of the educational sector, from primary to tertiary (Nicola et al., 2020). Problems that most often emerged were regarding a lack of appropriate resources, mental well-being of students, having an appropriate balance between multimedia and screen-free procedures etc. (Donitsa-Schmidt and Ramot 2020). This profoundly negative impact that the pandemic had on the education system resulted in a total closure of campuses and a reduction in face-to-face classes (Izumi et al., 2020). Consequently, teachers had to change their teaching methods accordingly by transferring to digital formats so learning and interaction can be carried out even remotely (Wilson et al., 2020).

This brings into focus the ever-increasing importance of how HEIs can utilize Instructional Design (ID) to facilitate the changing educational and andragogy approaches post-pandemic. ID can help TIM integration by providing instructors the appropriate analysis, design, development, implementation, and evaluation training and performance support solutions (Kanuka, 2006) to cater to remote, blended or asynchronous method of instruction. The importance of instructional designers as taking the lead in developing curriculum and online learning educational tools has been emphasized as they provide expert opinion to instructors on pedagogy, teaching using technology, course development and design, as well as a multitude of adjacent skills and resources (Drysdale, 2021). With the advent of COVID-19, the unique assets of ID became apparent as instructional designers are well-versed in the area of using technological tools to make learning easier and accessible – and they were able to intentionally apply their skills for emergency remote learning (Fuchs, 2022), hence making their them an essential institutional resource (Drysdale, 2021). On the other hand, research also suggests that the ID field can be overly technology-centred in its approach and in order to fully maximize the potential of integrating this knowledge into the andragogical landscape, more effort is needed to update the theoretical and developing ID frameworks as well (An, 2020).

Andragogical approaches post-2015 and post-pandemic is lacking in terms of career-ready education as adult learners do not graduate with the knowledge ready for the job market. Research suggests service-learning (Roe, 2022) or experiental learning (Kolb & Kolb, 2005) as a bridge towards creating more self-efficient and skillful graduates ready for their career trajectory (Roe, 2022; Santini-Hernández, 2022)

Asynchronous teaching is temporally and geographically independent which has made it an ideal mode of learning since the pandemic (Xie et al., 2018). Studies have shown how a cognitive achievement, like coming up with meaningful contributions, is more likely in asynchronous mode (Hrastinski, 2008; Garrison, 2011; Ogbonna et al., 2019). Since it is individually based it is also more self-paced and requires lesser instructor-dependency (Xie et al., 2018). Facilitating community has been considered an essential part of asynchronous teaching for constructivist educators, which has shown how student community-making and greater level of cognitive thinking take place in virtual learning (Levine, 2007; Mazzolini & Maddison, 2007). Robert and Dennis (2005) cognitive model of media choice suggests that asynchronous learning increases retention and processing of information since a person is given more time to understand the material on account of how an immediate response is not required. More information is also gathered since more thorough research can be done consequently.

Curriculum Issues and Pedagogy

Paradigm of education has shifted from instructor centric to student centric (Razzaq, 2013). The knowledge of how one learns best can make learning experience more effective and incorporating it in teaching style will help students learn more efficiently (Graf, 2007), it will also help in designing the course ware, curriculum, and medium of delivering (Othmana & Amiruddinb, 2010). The preferred learning styles are particular to culture and differ across gender as well (Razzaq & Nauman, March, 2009). It is not enough to change structures of

education but instructional approach needs to be changed according to culture and learning styles. Hence, the need for instructional design.

Kanu (2005) said developed countries' endeavor to transform the education system in the developing countries were not fruitful because they tried to fit the western model remaining oblivious to cultural context. Three aspects of culture—namely, concepts of self, discursive practices and indigenous approaches to learning have significant influence on curriculum and teacher learning, and may help educators to provide educational experiences that are grounded in the cultural realities of Pakistan (Kanu, 2005).

Higher education is supposed to prepare the graduates as per the labor market requirements. Thus, there needs to be a fine balance maintained between what should be taught as an essential skill and what is tailored for the required industry skill – teaching and developing syllabi according to the needs of individuals as well as enterprises is paramount for this to happen. As highlighted by literature, curriculum development is a science, therefore, it should be studied in a scientific way by analyzing the effective models of developed/developing nations. The method of teaching said curriculum also needs to be researched to accrue optimized and targeted learning outcomes by keeping in my mind the learning styles. Therefore, Interventions & Curriculum Development being treated as a methodological and systematic paradigm will provide graduates with the right set of competencies & skills as employability is inseparable from a good education (Ángel & Rego, 2014).

Conclusion

Therefore, a concerted effort should be in place to bridge the gap between public and private investment for tertiary education. Modernization of higher institutions' is crucial for knowledge economy (Rohit, Chhabra, & Singh, 2014 quoted Amin, 2012). Investment in teachers training and development through effective use of ICTs will create national innovation systems and enhance research capacity of the institutions (Wiseman & Anderson, 2012).

The education Research and Development is still in infancy to provide resolution of current problems in higher education or to develop new applications (Bryk, 2007). It is not enough to change structures of education but instructional approach needs to be changed according to culture and learning styles. To expedite progress in educational tool industries the public sector's management, governance and culture should be taken in account with a clear vision.

The national level policy issues entail focused, rigorous debates from national and international experts to come with innovative solutions to the problems. Collaborative researches with foreign aid agencies like USEF, World Bank and British Council (BC) etc. should address the gap that is in our national interest and viability of the projects to uplift the higher education in Pakistan. It is imperative to realize the role of HEIs specifically the business school as the enrollment in business education is at its peak. The funding agencies assess the education sector as an indicator of social, political, and economic status and development potential (Wiseman & Anderson, 2012), As Pakistan tertiary education needs sustainable

funding to produce qualified individuals and invest in education tool industry, motivate research for NIS so qualified individuals and requisite skill set can be imparted at university level. So more investment in HEIs is essential for economic growth through knowledge economies for sustainable development post Millennium development goals.

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