

Product Management of Research and Development Centers at Public Sector Universities in Pakistan

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Abstract

Research and development (R&D) charts out a framework through which professionals can establish useful linkage with information and research resources to put knowledge into practice. Whilst, the research and development (R&D) centers play a core role in productive management by developing collaborations among higher education institutions, modern research centers and industry. The present study aimed to analyze how much the research and development (R&D) centers are active in managing research and development practices to thrive research culture at public sector universities in Pakistan. The study was descriptive in nature and a questionnaire was used as a research tool which was finalized after its pilot testing. After validation of questionnaire, researchers personally visited and involved some learned people to collect data from 23 selected universities of Pakistan. Thirty respondents from each university were randomly selected as a sample. Keeping the views of majority of the respondents in mind, it may be concluded that research and development (R&D) centers are showing low efficiency while endorsing product management at public sector universities of Pakistan. The big and basic reason behind this poor product management of research and development (R&D) centers is the lack of industrial setup and modern research centers.

Keywords: Research and development, product management, advancement, innovations.

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Introduction

The term research and development (R&D) is comprised two components one is research and other is development (OECD, 2002). Amongst these two components, research is an experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts. It is a systematic and objective process of obtaining, recording, and analyzing data for decision making. It is a careful study or investigation of existing facts in order to discover new realities. In Bako's (2005) opinion, research is a systematic inquiry whose objective is to provide information to solve problems. As far as the development is concerned, it is a systematic work drawn from the existing knowledge and practical experiences for producing new materials, products or devices. Development is exploited to install new processes and services. Additionally, it is employed to improve the outdated systems.

The research has a logical relationship with development because the research explores the best data collection methods for achieving meaningful results, identifies any limitation associated with data collection, and interprets the results, whereas the development stands for the production of purposeful materials and technology for the growth of industrial sector. In other words, research and development (R&D) is a series of steps, techniques, exercises and events that can be applied for creativity and innovations in every walk of life. Furthermore, it is used to illustrate a complete set of data about a particular issue and is generally connected with the production of scientific knowledge, methods and instruments. It also provides knowledge, skills, tools and techniques needed to solve the real world problems.

Research and development (R&D) centers are the valuable sources potentially helpful in modernizing classical approaches. These perform superb role in offering first class graduates' studies, boosting their brain power, justifying quality education, endorsing research atmosphere and providing highly up-to-date methods of learning and teaching at higher education institutions. These are also much effective in training new generation of research fellows and scientists (Gay, 2005; Matos, 1999; Bartlett, & Burton 2009). Shabani (1996) noted that many countries have been failed in offering required priority to the development of the various resources needed for research activities in spite of recognizing the importance of the role of research in the socio-economic development process. Matos (1999) emphasized that without research, universities will lose the capacity to produce globally minded persons in the days to come.

In education, R&D centers may play a key role in developing useful products for the use in educational institutions such as teacher training resources, student learning materials, sets of behavioral objectives and an institutional administration means. In economics, there has been an increasing interest in invention and industrial research and development. The bulk of research results on productivity have also turned the attention of economists concerned with economic growth in direction of the process of technological change. Various industries/firms are commencing investment on research and development to build-up new products or new processes. Private firms are taking extravagant incentives for R&D to engage it in research and development activities (Opie, 2004).

The ratio of investment on research and development centers in developed countries such as USA, Japan, China, UK etc. is greater than developing countries such as Nigeria, Pakistan etc. to play productive role specially in higher education institutions (UNESCO, 2009).

Higher education is supported through the programs offered by all levels of government, private sector, non-profit organizations and foreign institutions. The success of higher education institutions is measured and monitored through their activities, performance costs, funding sources, means of monitoring, policy decisions and public discourse. The progressive higher education sector generates new knowledge and produces the highly qualified people needed to work in other sectors of the economy. Nevertheless, it all depends upon the product management of research and development (R&D) centers. We herein report the current scenario of product management of research and development centers at public sector universities of Pakistan.

Objectives of the Study

The study aimed to analyze product management of Research and Development Centers at the universities of public sector in Pakistan and to propose appropriate strategies for improving situation of product management of research and development centers at higher education institutions.

Research Methodology

The study was survey type and descriptive in nature on the basis of probability sampling methods. Thirty respondents from each university were randomly selected as sample including; ten research supervisors, five chairpersons and heads of departments, five deans of faculties, one R&D head, five R&D officials and four quality assurance personnel. Sample of the study comprised 230 supervisors, 115 chairpersons/heads of departments, 115 deans of faculties, 23 R&D heads/directors, 115 R&D officials and 92 quality assurance personnel. Overall, sample consisted of 690 respondents. A questionnaire was designed as a research tool in the light of objectives and keeping in view the related literature. The calculated reliability of the research tool was found 0.791. After validation of the research instrument, researchers personally visited the institutions and involved some learned persons to collect the data from selected sample from 23 public sector universities in Pakistan.

Analysis of the data

The collected data was tabulated and analyzed using chi-square, mean score, frequency and by simple percentage methods (see Table).

Table 1

Product Management of Research and Development (R&D) Centers

Statements	Responses								S.D ^d	Mean
	Disagree		UD ^c		Agree		Total			
	F ^a	% ^b	F	%	F	%	F	%		
Market-based knowledge	342	49.6	6	0.8	342	49.6	690	100	1.341	3.0
Market-based software	397	57.6	15	2.2	278	40.3	690	100	1.295	2.8
Market-based hardware	377	54.6	18	2.6	295	42.8	690	100	1.289	2.86
HRM personnel	336	48.7	12	1.7	342	49.6	690	100	1.296	3.03
Resource for HRD	332	48.1	6	0.7	352	51.00	690	100	1.284	3.04
Financial resources for customers	410	59.4	15	2.2	265	38.4	690	100	1.259	2.72
Literature for market demand	332	48.1	5	0.7	353	51.2	690	100	1.253	3.09
Scientists for further research & innovation	290	42.0	12	1.7	388	56.3	690	100	1.253	2.99
Overall Results		51.01%		1.58%		47.4%				2.94

Note. ^aFrequency; ^bPercentage; ^cUndecided; ^dStandard deviation

The data in Table 1 is exploring current situation of product management of research and development (R&D) centers in the universities. For responding the statement that research institutes provide market-based knowledge and information technology, 49.6%, 49.6% and 0.8% of the respondents agreed, disagreed and undecided respectively. However, 40.3%, 57.6% and 2.2% respondents agreed, disagreed and undecided to the active management of research and development (R&D) centers while designing market-based software, respectively. Similarly, 42.8%, 54.6%, and 2.6% of the respondents satisfied, dissatisfied and doubted about the better role of research and development centers in designing market-based hardware at public sector universities of Pakistan, respectively. On the other side, 49.6% and 48.7% of the respondents supported and opposed that research and development centers are producing human resource management personnel respectively, whilst the 1.7% respondents were unclear about statement.

Meanwhile, 51% and 48.1% of the respondents agreed and disagreed respectively whereas 0.7% of the respondents were in doubt regarding the responsibility of research and development (R&D) centers in organizing need-based resources for human resource development. The data reveals that 38.4% and 59.4% of the respondents thought that research institutes strengthen, does not strengthen financial status of customers whereas 2.2% of the respondents were ambiguous about the statement. According to the Table, 51.2% of the respondents felt that research centers create literature according to the market demand, but 48.1% of the respondents opposed and 0.7% of the respondents were uncertain about the aforesaid statement. The last statement that the research institutes produce scientists for further research and innovations was supported and opposed by 56.2% and 42% of the respondents, respectively. However, 1.7% of the respondents were unsure about the statement.

In overall, more than half (50.01%) of the respondents were of the view that research & development centers are not playing significant role in the product management while 47.4% of the respondents were of the positive views about the product management of research and development (R&D) centers at public sector universities of Pakistan.

Discussion

The product management is an important aspect of productivity and innovations and an important function of research & development centers in public sector universities and research institutions of higher education. Altbach (2011) discussed that productive research atmosphere included well-defined and innovative research processes, comprehensive research policies and workflows that are of significant value to make flow of research smoother. Further, Isani (2005) described that every university is trying its best to support research and development centers to promote research productivity.

In this research, it is clear to discuss that small number of research institutes at higher education are providing market-based information technologies and human resource management personnel to private sector and industry so far. The results of current research indicate that research centers at higher education institutions are not efficient in designing market-based software and hardware. Nevertheless, the main purpose of research and development centers in public sector universities was to introduce original products on demand of the market/ industry. Further, it is obvious from the findings that research and development centers organize resources for human resource development, however they are not playing credible role in strengthening financial status of the customers.

During discussions with respondents, majority of respondents' opinions show that research and development centers in public universities are creating updated literature and producing scientists for further research and innovations in the universities. Moreover, the performance of research & development centers is not satisfactory while introducing new products on demand of public and private sector industry. According to recent research report conducted by UNESCO (2009), the ratio of investment on research and development centers in developed countries such as USA, Japan, China, UK etc. is greater than developing countries such as Nigeria, Pakistan etc. to play productive role specially in higher education institutions. There is linkage between research and development centers and industrial sector.

Research and development capabilities exist within the country in a variety of disciplines. The link-up with industry will be beneficial to the research and development sector at higher education in a big way. The link-up can be achieved only through a variety of reforms within the science sector, as it requires a sea-change in attitude of the heads of research and development centers. The institutions of performance-evaluation, peer-review and creation of incentives, through funding streams allocated on the basis of performance, can do the better job.

Findings and Conclusions

Product management is an important factor of research and development (R&D) mechanism in public universities and research institutions of higher education. Purpose of the study was to analyze current situation of product management of research and development centers at public sector universities in Pakistan. The findings of this research indicated that less than half of the research institutes provide market-based knowledge and information technologies to the educational institutions and industry. It is also crystal clear from the data that most of the research institutes are not actively designing market-based software as well as market-based hardware. It was explored from data that less than half of the research institutes are producing human resource management personnel to fulfill the needs of admin and technical sections of public and private institutions. Furthermore, the data show that more than half of the research institutes organize need-based resources for human resource development to provide necessary trainings. The data further show that most of research institutes are inefficient in strengthening financial status of the customers. Further, it is indicated that more than half of the research institutes create literature according to the market demand. The data also reveal that most of the research institutes are producing scientists for further research and innovations in the universities. Overall, it was concluded that, more than half of the respondents seem disagree regarding product management of research and development centers. The study further concluded that lack of productivity and efficiency were found in product management of research and development mechanism in public sector universities of Pakistan. It is also concluded that no industrial setup and lack of modern research centers are reason behind poor condition of product management of research and development centers.

Recommendations

Product management is the most important aspect and specific task of R&D mechanism in the institutes of higher education. In academic institutions, its role has become very significant to ensure market based productivity of knowledge and information technology. Ignorance of product management in the research institutions makes it impossible to attain the desired goals of research and development mechanism. This research study strongly recommends that linkage should be developed between research institutes and industrial sector. Research institutions must introduce need based products that would be beneficial to local and foreign market. Research production must be up-dated, knowledge-based, and on demand of local industry. Software and hardware must be designed for the progress of industries and business sector. Research institutes must produce HRM personnel and manage need-based resources for human resource development.

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