

# Assessing Challenges Face By Pakistan R&D Sector In Context Of Knowledge Management Capabilities

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**Abstract:** Developing new knowledge capabilities provides an opportunity to create new technologies that diverts conventional business approach to R&D and value creation models, by configuring knowledge and innovation as the significant strategic asset in creating balance sheet. Speedy variations in current technology trends and beginning of groundbreaking technologies are catalyzing huge boost in productivity and accelerating birth to new segment of economic activities. The purpose of this research study is to investigate present role of knowledge capability practices to facilitate R&D activities. This studies explores the information on existing challenges face by Pakistan R&D sector in context of implement knowledge management capabilities by assessing gaps of knowledge capabilities rank in global competitive index (GCI) develop by world economic forum (WEF) and global innovation index (GII) with respect to other regional and emerging economies

**Keywords:** Knowledge management capabilities,

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## INTRODUCTION

National competitiveness considers as being tangible capability to generate and transfer products and relevant services efficiently and valuably in relation to other, competitive economies. Improving national competitiveness parameters in dynamic business environment with utilizing existing capability with comprehensive resource depend upon on merit and equip with innovative instruments

To survive among the exponential competitive business environment most of the business sectors developed retainable dynamic characteristics by collaborative adjustment of technical information and their internal and external functions. These functions includes existing process modification, firms spending more on to acquire new knowledges and technological capabilities. To encounter future demand firms looking more long term strategic approach to sustain their businesses (Winter, 2003). However, despite of numerous literature and studies on knowledge management capabilities (Donate, 2010; Mousakhani, 2012; Tseng, 2010; Yang, 2010) and effective impact on R&D (Chang, 2010; Huimin Ma, 2009; Nagano, 2013) still lack of an integrative perspective of how existing process, infrastructure and strategic factors involve as critical enablers for knowledge

capabilities (Andreeva, 2012; Foss, 2010). From previous research studies, there are certain unexplored domains to adjusted the key dimensions and criteria's for knowledge management capabilities and use of interrelationship among these criteria in context of developing policy making for R&D for long term sustainable business goal. That allows researchers to imply knowledge management capabilities as coherent source of academic research (Spender, 2015) . The crucial on-time decisions provide correct opportunity to understand future demand and often play significant character for selecting long term strategic business goals; i.e. firm's reconfiguration with respect to future competitive demand and retaining the existing competency compatible to new capabilities (Eisenhardt, 2000)

Due to serious financial meltdown hit to the global economies, the global business crisis may have channelized the fragile and uncertain financial discomfort imply negative impact on to some of domestic and international R&D projects. In fact, business in regional domain suffers as cross border trade decline to 60% as compare to 2007(Susan Lund, 2013)

Due to the high fluctuation in global economy it ripples to huge R&D investments, cautionary steps were imply to reimburse and restore more aggressive financial regulation in order to sustain the global investment

specifically on developing economies, Most particularly, international monetary fund develop a new monitoring approach to verify funding agencies with sufficient capabilities to bear the uncertainty and risk element involve in large R&D investments and retain capital inflows and outflows. More aggressive stance on developing investment regulation with appropriate cash flow management which remain in sustainable irrespective to the global business environment (Emanuel Alfranseder, 2014)

Pakistan has far lagged behind to their regional and emerging counterparts in attracting foreign investment and taking competitive advantageous of the potential expansion opportunities created due to technological growth, numbers of significant factors are involve in position to seize the opportunity further going forward. The investment boost required in high education that allows developing a prospect to influence innovation and technology for knowledge based economy- one in which there is still most of the conventional sectors will enroll rapid growth in productivity by blinding knowledge, innovation and technology. The conceptual ideology of 'knowledge based economy' cannot be perceived without nurturing quality high education equip with advance R&D support- both casual and in-casual- play a significant character in shaping economy and human skill development

Pakistan remain bottom in the region with approximately around 0.29% of the GDP tired on Research and Development (R&D) as compare other major playing economies such as India, which spend around 0.82% of their GDP, while Turkey around off approximately 0.94% exhausted to their GDP following by Malaysia which allocate 1.13% of their GDP spending to R&D. Interestingly, this expense of 0.29% of GDP interpret as Rs. 1300 per capita that government presently spending on R&D. Israel place top with Annual expenditure of 4.21% of its GDP, following by south Korea which spend around 4.15%, while Japan and USA with annual expenditure of 3.41% and 2.81% GDP o R&D respectively place their position at 3<sup>rd</sup> and 4<sup>th</sup>. Ministry of Science and Technology excessively criticized regarding the steps taken to initiative to starched more but current governments put

into ultra low priority which directly reflect to major caused for conflict with National Science and innovation policy 2012, and according to that policy the preferred recommended expenditure forecast is around 1% of GDP for the year 2015, expected growth to 2% by 2020. But in real picture, at current situation is quite different, less than 0.29% share GDP. The major projects related to the MOST (Ministry of Science and Technology) planned in 2007 still unfinished piling liabilities

## **THEROTICAL PERSPECTIVE OF KM CAPABILITIES**

Significance of acquiring new knowledge in an organization or in any business sector seems to be incompatible if there is no appropriate mechanism to handle knowledge. Knowledge management processes that most of the organizations adopted internally within their functional boundaries over the period of time are knowledge creation, knowledge sharing, and process of codification, propagates knowledge strategic perspective in shape of tacit and explicit (Darroch, 2003; Nonaka, 2009). In firms perspective KM is an ability to deals with comprehensive renovation of intellectual property and important information to develop significance for internal and external stakeholders by implementing suitable strategies and appropriate mechanism for knowledge identification, knowledge acquisition, knowledge creation and knowledge transformation across the functional boundaries within the organizations (McCampbell, 1999) Davenport and Prusak 1998 describe that KM significant to the in term of long strategic mean for both upper stream management domain to the low stream employees by enabling both explicit and tacit knowledge by channelizing through managing, retaining, implementing, acquiring, reconfiguring and updating the knowledge capabilities by implying with appropriate systematic approach in order to generate value and enhance organizational competitiveness(Davenport, 1998) Knowledge management capabilities consider as significant assets for organizations, it has to be strategically structured internally with coherent direction that can only be manage

with the supportive functions of KM strategy. For that purpose it is necessary to align overall organizational functional synchronized to main business strategies to enhance business performance. For long term perspective, firms retained their KM capabilities by mobilizing an active role of KM strategies for purpose to foster sustainable KM processes and utilization to develop factor that drive KM capabilities which includes knowledge creation, application, sharing, acquisition and collaboration (Zack, 1999)

To integrate the composite artifact of KM processes capabilities a sufficient organizational infrastructure required to coiled in process of knowledge transformation that synchronized the organizational functional capacity to share knowledge within the organizational domain,

KM infrastructure capabilities consider as influential factor that drive overall organizational activities such factors include internal functional structure, culture and technological strength that stimulate the process of knowledge sharing across the boundaries of organization (Choi, 2003; Migdadi, 2005). Inflexible infrastructures always face uncertainty and deceive the process of knowledge sharing

### **KM INFLUENCE IN R&D**

Knowledge management capabilities provides extensive role in facilitating the retainable R&D activities. In general terms, knowledge management capabilities comprise all driven instruments that match essential criteria for complex problem solving, developing of new conceptual ideas, and maximize the existing throughput of R&D activities. As compare to other conventional management activities which includes well define set of management routines with systematic instruction while, R&D processes quite diverse more emphasized on knowledge creation, knowledge screening, knowledge sorting, knowledge capturing and their significant utilization, all these activities performed simultaneously with utmost care in order to maximize the innovational benefit (Abbas, 2012)

R&D processes rely on the effective essence of knowledge conversion processes followed by knowledge transmission activities. Knowledge management capabilities compiles on such factors that produced to elevate the quality standard, reduced overall cycle time from idea creation to product development preferred to be encouraging practice in R&D operations (Abbas, 2012)

### **ASSESSING CURRENT LIMITATION IN CASE OF PAKISTAN**

According to Global competitive index (GCI, 2015-2016) (Schwab, 2015-2016) Pakistan still struggling to sustain their competitive edge among their regional and emerging counterpart as from overall weighted criteria of basic requirement Pakistan still premature in retaining stable basic requirement and stuck with in 60% that influence major portion of overall index of global competitiveness. The basic requirement criteria includes existing strengths of institutes that still unable to mark as compare to international standard, Pakistan rank 119 out of 140 countries (Schwab, 2015-2016). The other index pillars includes infrastructure Pakistan facing serious challenge to retained the basic infrastructure in order to facilitate more foreign direct investment inflows which around than 2 billion dollar unable as compare to India which attract 28 to 30 billion dollars in year 2015 (Pakistan, 2015-2016 ; Schwab, 2015-2016). Similarly the third pillar of the criteria of basic requirement is micro economic indicator which ranks Pakistan 128 out of 140 countries due to unrest internal economic activities lack of investment because of high energy tariff and consistent shaking inflation rate (Schwab, 2015-2016). While, health and primary education consider as fourth indicator for the criteria of basic requirement still unstable and overall rank Pakistan 127 out of 140 countries because of low

government spending according to world bank survey pakistan spend around 2.61 % of their GDP on public health sector (World Bank Economic indicator) and around 2.3% of their GDP on their overall education sector(Dr. Allah Bakhsh Malik, 2015)

In case of efficiency enhancers criteria which influence 35% overall ranking Pakistan still struggling to shape their feet in order to sustain Labor market efficiency Pakistan rank 132 out of 140 countries due to lack of skill set or brain drain due to unsustainable economic condition. Similarly, Technology readiness used to measure overall technological capabilities during transition from scientific research to applied research still losing grip where pakistan rank 113 out of 140 countries for validation (Schwab, 2015–2016)

There some improvement observed as far as Innovation and sophistication factors is concerned which influence 5% on overall competitiveness index where business sophistication indicator move to 86 position out of 140 countries while the innovation and translation innovational capabilities rank 89 placed out of 140 (Schwab, 2015–2016) still more effort required to boost the innovational capabilities to imply for more competitive advantageous as major source for retainable and progressive R&D activities

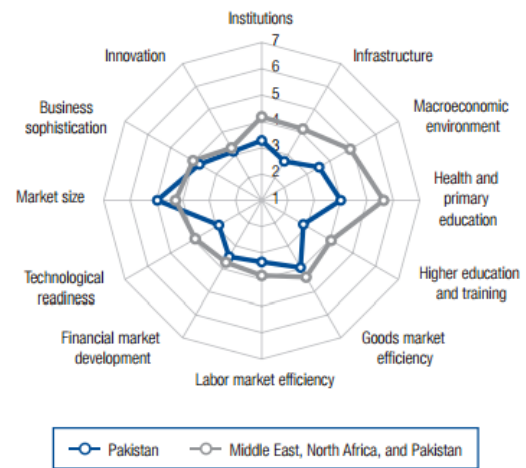


Figure 1: The Global Competitiveness Report 2015-2016<sup>1</sup>

### COMPARE WITH OTHER EMERGING COUNTERPARTS

Pakistan remain bottom in the region with all the significant instruments used for measuring knowledge capability according to GII, 2016 (global innovation index 2016), Pakistan face a serious challenges as compares to their regional counterparts regarding to acquires knowledge and technology output. Pakistan place at 90<sup>th</sup> position in out of 140 countries, the knowledge and technology output indicating unit basically comprises on country overall ability to have knowledge creation capability, knowledge integration with overall knowledge impact actually influence research and development particularly when developing the new knowledge based economy, Similarly India place at 43<sup>rd</sup> out of 140 countries with slightly higher GDP growth spending o R&D. While on the other hand Malaysia and Turkey is more progress middle income economies that place their mark 35<sup>th</sup> and 41<sup>st</sup> out of 140 countries, In case developed economies Israel and South Korea mark their position 12<sup>th</sup> and 5<sup>th</sup> respectively

<sup>1</sup> \*\*On rang of 1 (worst) to 7 (best) Pakistan is far behind critically in 8 out of 12 major indicator

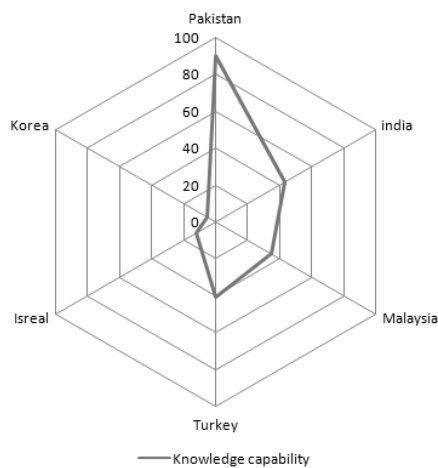


Figure 2: The Global Innovation Index Report<sup>2</sup>

### KM PRACTICES IN PAKISTAN R&D SECTOR

Pakistan consider as middle income economy, where the importance of knowledge capabilities has been recognized. But due to inadequate practice and less effective integration to the National innovation program failed miserably due to comprehensive lack of awareness to interface current and future knowledge and interpret R&D activities as tool for potential economic revival.

Pakistan remain under extensive pressure as country with limited resources, balanced focus on R&D advancement is required to support future demand in order to elevates social and economic status of common people. The major challenges are capital fly with lack of funding agencies due to worst political turmoil, major concerned to retain technical skill losing the grip because of brain drain, Pakistan still far behind for the countries which consistently improve their technological capabilities and starded their R&D sector to adopt knowledge management routines as a critical factor to the performance (Abbas, 2012)

Implementing knowledge management is all about delivering accurate information

to right set of people at in accurate time(McElroy, 2003). The crucial influential of accumulated knowledge is to facilitate the process to adjust the firm's innovation capabilities; this generally rooted from the firms skill set the people high intellectual abilities that drive productive processes with complex routines and other organizational characteristics (Arabella Bhutto, 2012)

In case of the Pakistan, trends quite discouraging as most of the industrial sectors were less progressive toward the R&D activities, that allows companies to acquired technologies externally due to the inconsistency for retaining knowledge management capabilities. As result of such external acquisition the process of absorption of advance technologies which mostly influences the production houses faces comprehensive transition of organizational change (Goedhuys, 2005). In order to observe such organizational transformation, Pakistan council of science and Technology only proposed the measuring indexes for patents and scientific publications which is unsuccessful to portray any parameters for the internal organizational change (Arabella Bhutto, 2012)

It is observed that K.M facilitates the significant issues of organizational change during the transformation of knowledge adoption; it supports to sustain the process of survival and business competencies in dynamic business environment. In reality, it exemplify business sectors to search a synergistic blend of technical data and processing ability of such technical information in shape of advance technologies with innovative capacity in shape of right human skill set (Malhotra, 2001) . Therefore, statistical evidence to initiate policy making as supportive element to generate new knowledge, for that purpose Planning Commission of Pakistan established some statistics of knowledge economic index

<sup>2</sup> \*\*On rang of 1 (Best) to 100 (Worst)

| Years | Knowledge Economy Index | Knowledge Index | Economic incentives Regime Index | Innovation Index | Education index | ITC Index |
|-------|-------------------------|-----------------|----------------------------------|------------------|-----------------|-----------|
| 2012  | 3.6                     | 2.63            | 1.93                             | 2.84             | 1.44            | 3.6       |
| 2000  | 3.22                    | 2.27            | 1.67                             | 2.3              | 1.3             | 3.22      |
| 1995  | 4.59                    | 2.94            | 2.31                             | 2.81             | 1.41            | 4.59      |

**Table 1: Knowledge Economy Index**

These statistical values helps R&D policy maker to screen and validate the inside organizational abilities to understanding significance of knowledge management or enabling knowledge capabilities to restrain their processes to meet the future demand, this will further promote sensitivity of knowledge management capabilities in term of measuring the internal strength of overall organization specially R&D business driven firms. Such internal knowledge asset provides the foundation of empirical evidence that can encourages to R&D policy maker to screen performance in shape of applying knowledge capabilities as potential indictor to achieve competitive advantageous and also used as for policy formulation(Tijssen, 2006)

### CONCLUSION

This research study highlights widespread overview regarding exiting challenges face by R&D sectors in Pakistan in context of understanding significance of knowledge management capabilities followed by proposing the significance of knowledge economic index as potential tool that helps R&D policy maker to empirically measure internal knowledge strength for organization. The comprehensive guideline propose in this article help policy maker inducting new approach to translate knowledge management capabilities toward R&D sector

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