

DEVELOPING FRAMEWORK FOR
CAPABILITIES RELATED TO SUPPORTING
MANAGEMENT DISCIPLINE THAT
CONTRIBUTES TO R&D IN PUBLIC
ORGANIZATIONS OF PAKISTAN

ZEESHAN ASIM

DOCTOR OF PHILOSOPHY

UNIVERSITI MALAYSIA PAHANG



SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Doctor of Philosophy.

A handwritten signature in black ink, consisting of a stylized 'S' followed by a horizontal line.

(Supervisor's Signature)

Full Name : DR. SHAHRYAR SOROOSHIAN

Position : ASSOICATE PROFESSOR

Date:



STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

(Student's Signature)

Full Name : ZEESHAN ASIM

ID Number : PPT16003

Date :

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ABSTRAK

Penangunan dan Penyelidikan (R & D) di bawah lingkungan skop pengurusan telah menjadi satu aspek penting bagi peringkat individu, organisasi dan global. R & D telah lama dianggap sebagai keutamaan bagi negara-negara yang sedang membangun. Walau bagaimanapun, R & D di seluruh negara-negara membangun menghadapi kekurangan penting dalam mengklasifikasikan keupayaan untuk menangani isu ketidakupayaan. Hasil daripada masalah tersebut, terdapat permintaan yang berpotensi dalam kalangan organisasi awam untuk mewujudkan model secara teori yang berkaitan R & D di peringkat organisasi. Objektif utama kajian ini adalah untuk menawarkan sebuah model metodologi yang menyokong dalam penstrukturan semula rangka kerja R & D berdasarkan keupayaan untuk menyokong pengurusan disiplin. Untuk mencapai matlamat utama, kajian ini terdiri daripada kajian teori dan empirikal: Kajian literatur umum; kajian literatur secara sistematik tentang keupayaan berkaitan dengan sokongan disiplin pengurusan yang terlibat di dalam R & D; perbincangan kumpulan fokus diaplikasikan untuk menapis keupayaan di bawah pandangan khusus negara; Menggunakan model yang dicadangkan dalam kes organisasi awam Pakistan untuk menyusun semula orientasi R&D untuk menghadapi cabaran pada masa hadapan. Kemajuan berdaya saing dalam mana-mana firma R & D mempunyai implikasi silang budaya khusus kepada negara di mana R & D berfungsi sejak kajian ini menarik kes R & D di dalam organisasi awam Pakistan. Oleh itu, teknik kumpulan Fokus disesuaikan dengan penapisan keupayaan yang berkaitan dengan inovasi pengetahuan dan pengurusan teknologi sebagai "menyokong disiplin pengurusan". Keupayaan ini dikumpulkan daripada kajian literatur yang sistematik (PRISMA and Co-word analysis). Pakar-pakar yang dinamakan terdiri daripada pelbagai pusat penyelidikan yang merangkumi universiti, organisasi awam. Tambahan pula, berdasarkan keputusan kumpulan fokus hasil hubungan dan keutamaan keupayaan dapat dirumuskan melalui teknik DANP Teknik. DANP (DEMATEL Berdasarkan ANP) teknik menggunakan pakar-pakar pelbagai disiplin yang membolehkan model umum pemasangan khusus untuk R & D dalam organisasi awam. Daripada kajian ini dapat dibuat satu kesimpulan, dengan mengisi jurang kekurangan potensi yang berlaku dalam bentuk kegagalan keupayaan. Kajian ini mempunyai konsep novelti pada infrastruktur, proses dan perspektif strategik yang berkaitan dengan keupayaan yang dimiliki oleh pengetahuan, inovasi dan pengurusan teknologi selari dengan tingkah laku sumber-sumber mereka yang secara tidak langsung mempengaruhi kepada R & D. Keupayaan perspektif sebagai pembuat keputusan kriteria yang membolehkan untuk menilai kekurangan dalam mengklasifikasikan keupayaan untuk menangani isu kegagalan keupayaan. Kajian ini membolehkan pembuat dasar membangunkan rangka kerja R & D yang mungkin berguna untuk negara-negara membangun yang tidak mempunyai hak keistimewaan lain di mana dinyatakan bahawa R & D model memainkan peranan penting dalam membangunkan polisi sains kebangsaan.

ABSTRACT

Research and development R&D under the boundaries of management scope has become a crucial aspect for individual, organizational and global level. R&D has long considered as a top priority for developing countries. However, R&D across developing countries confronts vital deficiencies in classifying capabilities to address capability failure issue. As result of such problem, there is potential demand among public organizations for creating theoretical model dealing R&D at organizational level. The prime objective of this research is to classify the capabilities related to supporting management discipline that adds their influence on R&D, To analyze the interrelationship among the capabilities related to supporting management discipline for R&D in Pakistan Public Organizations and To prioritize the capabilities that involve at R&D in public organizations based on their interdependency in case of Pakistan . To accomplish the primary objective, the research comprise on theoretical and empirical studies: General literature review; Systematic literature review gathering capabilities related to supporting management disciplines that involve in R&D; Focus group discussion applied for refining capabilities under country-specific view; Applying proposed model in case of Pakistan public organization to reconfigure R&D orientation to confront future challenges. Competitive progression in any R&D firm does have cross-cultural implication specific to country within which the R&D functioned since is this study draw the case of R&D in Pakistan public organization. Therefore, Focus group technique adapted to refining relevant capabilities related to knowledge innovation and technology management as “supporting management discipline”. These capabilities gathered from the systematic literature review (PRISMA and Co-word analysis). The experts nominated from various research centers that include universities, public organizations. Furthermore, based on focus group results the interrelationship and prioritization of capabilities can be formulate through DANP techniques. The DANP (DEMATEL Based ANP) technique utilizes multidisciplinary experts that allow general model fitting specifically to R&D’s in public organization. The study concluded, by filling the potential gap that occurs in shape of capability failure. Key finding of this study is to draws novel Framework on infrastructural, processes and strategic perspective related to capabilities that belongs to knowledge, innovation and technology management along with behavior of their resources that influence indirectly on R&D. The capabilities perspective as criteria’s allowing decision makers to assess the vital deficiencies in classifying capabilities to address capability failure issue. This research enables policymakers to developed R&D framework that might be useful for other low privilege developing countries where state driven R&D model plays a crucial role in developing national science policy.

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LIST OF SYMBOLS

α	Threshold Value
T'	Normalization of Total Matrix

LIST OF ABBREVIATIONS

K.M	Knowledge Management
I.M	Innovation Management
T.M	Technology management
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
R&D	Research and Development
K.cre	Knowledge Creation
K.Acq	Knowledge Acquisition
Int Kno Port	Intellectual Knowledge Portfolio
K.shar	Knowledge Sharing
K.Imp	Knowledge Implementation
K.tran	Knowledge Transfer
Cult	Culture
Stru	Structure
Tech	Technology
Peop	People
Lead& Supp	Role of Leadership & Support
org. Lear	Organizational Learning
Succ. Rate	Success rate of R&D products
Code	Codification
Pers	Personalization
Ex.kn	External knowledge source
Int.Kn	Internal knowledge source
Tech .Tran	Technology Transfer
Dec.Mak	Decision Making Process
In. Op Inn	Open Innovation
Proj. mang	Project Management
Inn. com	Innovativeness Compability
Rate Int	Rate of Introduction New Product
Int & Ext Kno	Internal & External Knowledge Sharing
R&D.Corp	R&D cooperation

Ext Net	External Networking
Know .Inc	knowledge incentives
Rad Inn	Radical Innovation
Abso. Cap	Absorptive capacity
R&D Empo	R&D Employee
Tech Tren	Technology Trends
Inno. per	Innovative Performance
Inov Str& ini	Innovation strategies and initiatives
Org.Str	Organization strategy
Tech. Acq	Technology Acquisition
Tech. Expo	Technology Exploitation
Tech. Pro	Technology Protection
Tech. lear	Technology Learning
Tech. Sele	Technology Selection
Tech. Iden	Technology identification
Tech Deve	Technology development
Mang Cap	Management Capability
Fac	Facility and Equipment
Org. Capa	Organization Capability
Pers. Skil	Personal Skill
Str Tech	Strategic Technology Road Mapping
Corp Tech Stra	Corporate Technology Strategy
Corport Bus Strat	Corporate Business Strategy
Tech Alli	Technology Alliance Strategy
Desor. Cap	Desorptive Capacity
GII	Global Innovation Index
GCI	Global Competitive Index
TAI	Technology Achievement Index
IMF	International Monetary Fund
TMC	Technology Management capability
IMC	Innovation Management Capability
KMC	Knowledge Management Capability
NUST	National University of Science & Technology

UNESCO	United Nations Educational, Scientific and Cultural Organization
NCST	National Commission of science and technology
MOST	Ministry of Science and Technology

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