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Research Database

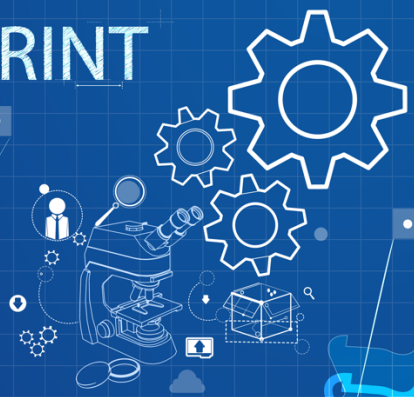
Project Proposal Submission

Resource Allocation Management

National Research and Development Management System

BLUEPRINT

R&D



Publication and Citation Database

Integration with Funding Sources

Researcher Expertise

PREFACE

Cambodia's National Research and Development (R&D) Management System Blueprint represents a pivotal milestone in our nation's commitment toward harnessing Science, Technology and Innovation (STI) for sustainable development and achieving the government's 2050 vision. As we embrace the opportunities and challenges of the 21st century, it is evident that STI, particularly through R&D, will serve as the cornerstone of our national progress and prosperity. R&D holds an immense potential to drive economic development through fostering innovation, increasing productivity with a high-value add and promoting product diversification. Furthermore, R&D holds the key to addressing our social challenges including sustainability, climate change, and others.

This blueprint is a timely strategic document that perfectly aligns with the government's commitment to transforming Cambodia into a digital economy and society. Through the National STI Policy 2020-2030, we have built a foundation for promoting STI to support inclusive and sustainable development. The Cambodia STI Roadmap 2030 and the National Research Agenda 2025 further guide our efforts towards building research capacity and quality. They foster a culture of innovation and entrepreneurship, and ensure that R&D activities align with national priorities and demands of the society.

The National R&D Management System outlined in this blueprint is more than just a mere tool to support R&D activities. It is a comprehensive and strategic framework guiding Cambodia's efforts in R&D investment and planning, ensuring that they are highly efficient and effective and meet the expectations. Through co-formulation process, the system will empower researchers, foster collaboration, and enable efficient allocation of resources. It will also address critical challenges faced by our research ecosystem, such as fragmented processes, limited funding, and a lack of coordinated platforms for innovation.

I would like to express my sincere appreciation to STEPI and KISTI of the Republic of Korea who provide support contributing to the development of this blueprint. I thank all stakeholders, namely government agencies, higher education institutions, research centers, and private sector representatives for their active participation, valuable insights and contributions to this important initiative. I also commend General Department of Science, Technology and Innovation and experts involved in this project who have conducted extensive consultations, surveys, and analyses that form the backbone of this blueprint.

As we move forward, I strongly encourage all stakeholders to continue the support and cooperation in our endeavors to develop a robust and vibrant R&D ecosystem in Cambodia. Let us embrace this opportunity for Cambodia to transform into a knowledge-based and innovation driven economy. Together, we can ensure that STI becomes the driving force of our nation's progress and prosperity.

Phnom Penh,.....9.....April.....2025

Minister and Chairman of NCSTI

HEM VANNDY

EXECUTIVE SUMMARY

The Royal Government of Cambodia (RGC) is steadfast in the commitment to transitioning to a high middle-income country by 2030 and achieving high-income status by 2050, widely known as Cambodia's Vision 2030&2050. To realize this ambitious vision, RGC has set the prioritization on enhancing national scientific and technological capabilities and fostering innovation performance, all of which are of paramount importance to not only diversify the economy, promote sustainable development, but also transition from a labor-intensive to a knowledge-based economy. The Cambodia's STI Roadmap 2030 and National Research Agenda, the top-level national policies, serves as a cornerstone of this vision, emphasizing research and development (R&D) as a driver of national growth. Key initiatives, outlined in these policies, highlight the necessity to build a robust R&D frameworks, one among the critical components is the establishment of a National R&D Management System. This system is envisioned to enhance research capacity, align R&D activities with national priorities, and build a strong foundation for a National R&D Fund that aims to support innovation and entrepreneurship of Cambodia.

This blueprint is the initiative that guides Cambodia's effort to build a robust research ecosystem through the establishment of an effective system that reflects the demands of researchers and scientist communities in Cambodia. It presents a comprehensive framework for developing Cambodia's National R&D Management System, systematically addresses regulatory frameworks, demand analyses, operational plans, technical feasibility, and impact assessments, providing actionable recommendations to ensure successful implementation and ensuring that this system align with the researchers through the questionnaire survey, interview, and consultative workshops from universities across the country. In addition, this blueprint identifies current challenges in R&D management practices, outlines priority system functions, and provides strategic recommendations tailored to Cambodia's needs and context. It proposes a system that responds to the demands of researchers and stakeholders while aligning with national policies to maximize the potential of R&D activities.

The blueprint has identified the key characteristics as the top priorities for the National Research and Development Management System, as outlined below:

- **Research Database:** This database would serve as a centralized repository for systematic storing and organizing study data, methods, conclusions, and related documentation. In order to facilitate smooth data retrieval and cooperation, the system should allow the structured storing of a variety of data kinds, from experimental results to book references. This feature is thought to be essential for maintaining research knowledge and encouraging cooperation both inside and across research teams and organizations.
- **Project Proposal Submission:** This feature would make it easier to submit, evaluate, and manage proposals for research projects. Researchers see a platform where they

may draught and submit proposals for new initiatives, monitor the status of the proposal, and get input from funding organizations or other researchers.

- **Resource Allocation Management:** The function that effectively distribute resources like money, staff, gear, and lab space is emphasized by the respondents. Real-time tracking and resource optimization should be possible with such a system, guaranteeing that researchers have what they need to do their work efficiently. It is envisaged that a dynamic resource allocation system will lessen resource waste, improve project efficiency, and eliminate bottlenecks.
- **Publication and Citation Database:** A system that seamlessly tracks their publications, manages citation data, and supports the referencing of their own work. This feature aids in keeping researchers informed about the impact of their research, simplifies citation management, and ensures accurate attribution of intellectual contributions. Furthermore, it can foster collaboration by identifying synergies with other researchers and their work.
- **Researcher Expertise:** A feature that allows the system to profile and showcase the individual researchers' areas of expertise. With this feature, researchers might highlight their contributions, interests, and abilities, which would make it simpler for possible partners to find subject matter experts. This function can increase researcher synergy and knowledge sharing by promoting links and multidisciplinary collaboration.
- **Integration with Funding Sources:** Integrating the R&D management system with different financing sources. The goal of research is to optimize grant application, financing management, and project financial tracking procedures. Through this integration, financial resources would flow smoothly, compliance with funding regulations would be made easier, and researchers would have direct access to funding options. It is thought to be necessary for the long-term viability of the system and research initiatives.

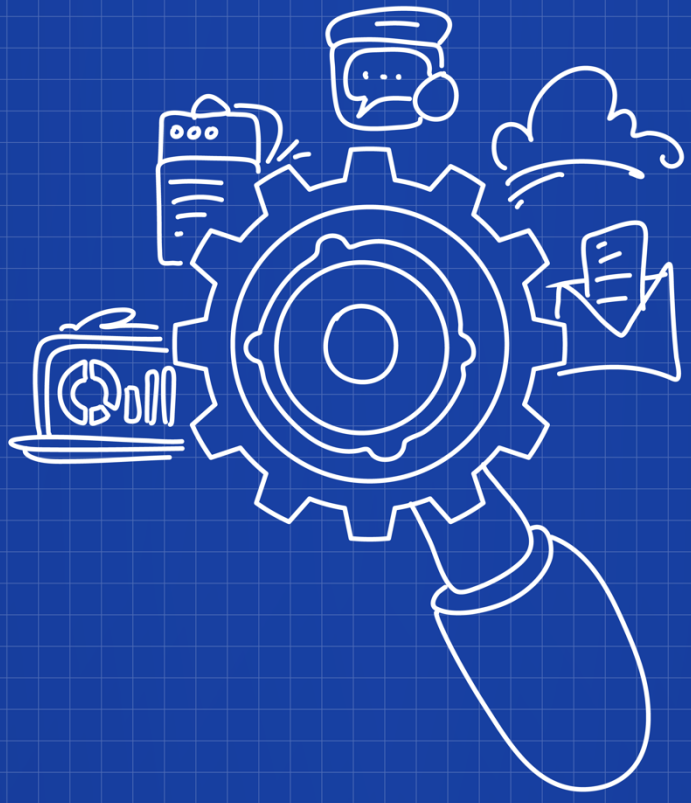
Cambodia can establish a robust foundation for a transformative research and development (R&D) ecosystem that fosters innovation, supports sustainable development, and enhances its global competitiveness by implementing the National R&D Management System in conjunction with strengthening institutional leadership and coordination, ensuring sustainable funding mechanisms, promoting stakeholder engagement and capacity building, and establishing clear policies for data sharing, intellectual property, and collaboration.

TABLE OF CONTENT

LIST OF FIGURES AND TABLES

CHAPTER 1

INTRODUCTION



The Royal Government of Cambodia (RGC) has set out the ambitious vision to become high middle-income country by 2030 and high-income country by 2050. Thus, strengthening national scientific and technological capabilities and improving innovation performance is the key success for realising this ambitious vision of Cambodia. Moreover, this enhancement will also promote economic diversification and boost economic dynamism for sustainable and inclusive development, and leverage national prosperity, peace, security, safety and quality of life. In addition, progress in scientific and technological capabilities and know-how will be a pivotal driver to enable and accelerate the economic structural transformation from labour intensive to knowledge-based economy.

In 2019, RGC has approved the National Science, Technology and Innovation (STI) Policy 2020-2030[1] that aims to harness the power of science, technology, research and development to support inclusive and sustainable development and realize the Government's ambitious vision through the establishment of strategic framework, objectives, and policies. The establishment of Cambodia's STI Roadmap 2030[2] is a key example of implementation of this policy. One pillar of this roadmap is to strengthen research capacity and quality by building the capacity of the higher education and research system to conduct high quality R&D activities of national interest that address societal and private sector needs. One of the key activities, clearly stated in Cambodia's STI Roadmap 2030, is the development of the National Research Agenda and National Fund dedicated to Research & Development (R&D) for the progress of national scientific and technological capabilities to enable and accelerate the "catching-up" to happen. Moreover, the national research agenda also aims to provides a crucial framework for the implementation of knowledge creation and innovation promotion, identify the overarching scientific challenges for the future of the nation, and enable thematic prioritization and efficient allocation of resources among different stakeholders. To achieve this, robust funding for R&D is paramount to harness the potential of innovation and entrepreneurship. Consequently, this project aims to develop the National R&D Management System, which has the potential to attract government investment in scientific research activities. This investment, in turn, could lead to the establishment of a National R&D fund.

[1] *Royal Government of Cambodia, RGC (2019), "National Science, Technology and Innovation Policy 2020-2030"*
[2] *RGC (2021), "Cambodia's Science, Technology and Innovation Roadmap 2030"*

1.1 Objectives

This Blueprint has been developed under a comprehensive understanding of the current situation and challenges of R&D management practices in Cambodia. It identifies the demands and requirements of researchers and scientists of the National R&D Management System of Cambodia. This blueprint has also outlined the priority functions of an R&D system that can respond to the needs of researchers in Cambodia to leverage R&D activities by designing a National R&D Management System that aligns with Cambodia's priority and context. The blueprint has elaborated the regulatory framework of Cambodia, operational plan, technical feasibility, and well-planned financial estimation, along with the impacts and risks assessment to ensure the comprehensiveness and rigor of the research process.

1.2 Methodology Approach

This study relied on the quantitative and qualitative approaches. First, the desk review aims to brainstorm and get more understanding the current situation of R&D management system in Cambodia, challenges and solutions of the current R&D management, and functions of the ideal of national R&D management system and its challenges. Then, the interviews were carried out with 4 key senior experts who have comprehensive knowledge and experiences on R&D management system in Cambodia to gain in-depth understanding.

Online survey was conducted within the researcher community from September 28 to October 31, 2023. The survey aimed to explore the prevailing R&D practices and associated challenges, the ideal features of R&D management systems, and challenges faced within the R&D management systems. The consultative workshop was then conducted to have a consultation on the survey results and discuss the R&D ecosystem in Cambodia. The participants invited to join in this workshop are experts from diverse organizations, including line ministries, higher education institutions and research centers, and the private sector, all of whom have a high degree of expertise and are experienced in research and development and are very familiar with the research landscape in Cambodia. The workshop discussed three main topics to gain qualitative information and inputs related to their existing R&D program/project management practices that have been practiced in their organizations, the challenges for managing R&D program/projects faced in their organizations, and last but not least, the features of a national R&D management system tailored to meet the specific needs of Cambodia. Finally, the

validation workshop was conducted to validate the research's key findings, participated by approximately 160 scientists, researchers, and professors from government, universities and research centers across Cambodia.

Figure 1: Consultative workshop activities

1.3 Demographic Information

Among the total of 67 researchers, shown in table 1, males comprised the majority at 77.61%. In terms of age distribution, the highest percentage of researchers fell within the 35-44 years old category, accounting for 43%, while those in the 25-34 years old range made up 38.81% of the respondents. In addition, 47.76% of the respondents held master's degrees as their highest academic qualification, with 44.78% having earned a PhD as the second most prevalent academic achievement. Out of the respondents, 35.82% had 5 to 10 years of research experience, and 29.85% were senior researchers with over 10 years of research experience. The majority of their research efforts are engaged in collaborative projects with other institutions or researchers, comprising 77.76%. Researchers showed a preference for publishing their research findings in international peer-reviewed journals, followed by international conferences and workshops. Some aimed to publish 1-3 research findings per year, while others were dedicated to publishing more than 3 research findings annually. Furthermore, a majority of researchers had experience using digital tools or systems for research management, accounting for 55.22%. The researchers in Cambodia have a variety of areas of focus, as shown Table 1, such as educational sciences, economics and business, civil engineering, computer and information sciences, environmental engineering, health sciences, biotechnology, electrical and electronic engineering, sociology, agriculture, forestry, fisheries, environmental

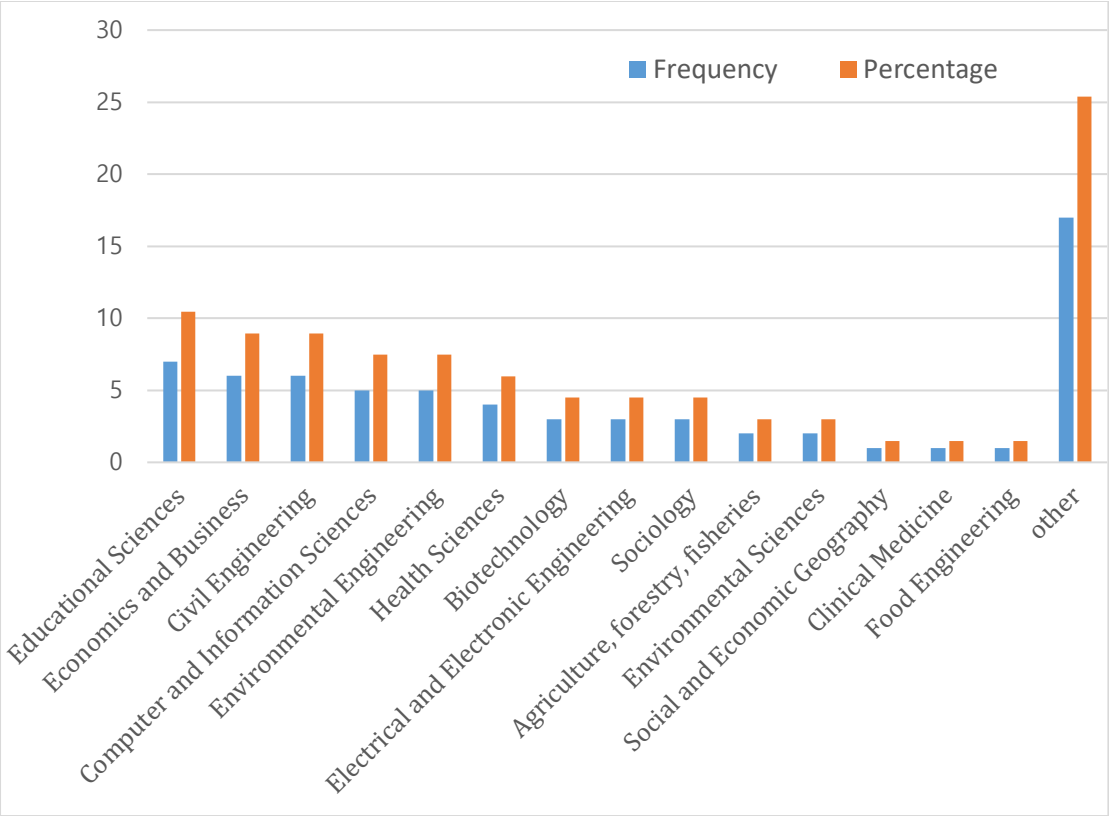
sciences, social and economic geography, chemical engineering, clinical medicine, food engineering, and other relevance. Demographic information of the respondents can be found in the table below.

Table 1: Demographic information

Information of Respondents	Category	Frequency	Percentage
Gender	Male	52	77.61
	Female	15	22.39
Age	Less than 25	2	2.99
	25-34	26	38.81
	35-44	29	43.28
	45-54	7	10.45
	More than 54	3	4.48
Highest Academic Qualification	Bachelor	2	2.99
	Master	32	47.76
	PhD	30	44.78
	Postdoc	3	4.48
Years of Experience in Research	Less than 5 years	23	34.33
	5-10 years	24	35.82
	More than 10 years	20	29.85
Involving in collaborative research projects with other institutions or researchers	Yes	52	77.61
	No	15	22.39
Providing research grants/funding	Yes	26	38.81
	No	41	61.19
Publishing research findings	International peer-reviewed journals	45	67.16
	International Conferences and workshops	38	56.72
	National peer-reviewed journals	32	47.76
	National Conferences and workshops	29	43.28
	Online research networks	10	14.93
	Other	10	14.93
Frequency of publishing research findings	Very frequently (more than 3 per year)	3	4.48
	Frequently (1-3 per year)	21	31.34

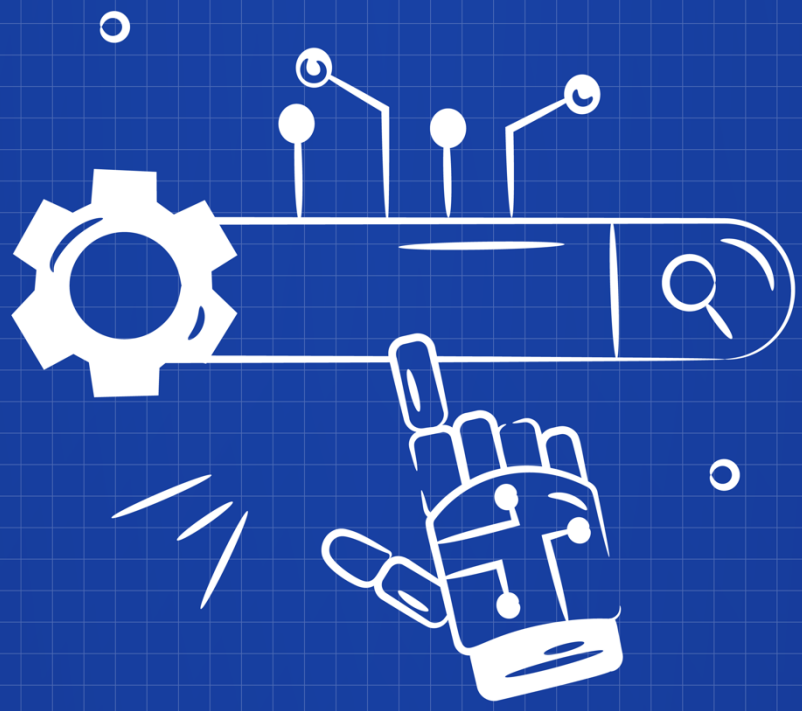
Information of Respondents	Category	Frequency	Percentage
	Occasionally (1 every 2 years)	21	31.34
	Rarely (1 every 3-5 years)	14	20.9
	Never	8	11.94
Experience of using digital tools or systems for research management	Yes	37	55.22
	No	30	44.78
Field/Area of Research	Educational Sciences	7	10.45
	Economics and Business	6	8.96
	Civil Engineering	6	8.96
	Computer and Information Sciences	5	7.46
	Environmental Engineering	5	7.46
	Health Sciences	4	5.97
	Biotechnology	3	4.48
	Electrical and Electronic Engineering	3	4.48
	Sociology	3	4.48
	Agriculture, forestry, fisheries	2	2.99
	Environmental Sciences	2	2.99
	Social and Economic Geography	1	1.49
	Chemical Engineering	1	1.49
	Clinical Medicine	1	1.49
	Food Engineering	1	1.49
	other	17	25.37

Figure 2: Field of research area of respondents



CHAPTER 2

REGULATORY FRAMEWORK



To realize the ambitious 2050 vision, the government has been looking into emboldening the structural transformation, specifically transitioning from a labor-intensive economy to a knowledge-based economy, which highlights the importance of the role of Research and Development (R&D) underpinning the development of human capital, identify societal problems and tackle them, develop innovative methods and products, leverage national innovation capabilities of the country, all of which leading to create a robust, inclusive, and sustainable socio-economic development. To this end, the government of Cambodia, through various ministries and government agencies and institutions, has embedded R&D directly and indirectly into their respective policies and regulatory frameworks such as agriculture, energy, health, and industries.

This section aims to demonstrate the government of Cambodia's efforts in enhancing R&D in the national policies to leverage economic development and tackle the country's challenges and ultimately to realize the 2050 vision and its inclusive and sustainable development goal.

2.1 The National Core Policies

To achieve the Sustainable Development Goals and realize the 2030 and 2050 visions, the Royal Government of Cambodia has always disseminated its core policy flagship at the commencement of the new legislature of the national assembly. These policies cover all prioritized sectors and outline the policy agenda and targets that the government aims to achieve within its mandate.

- **Pentagonal Strategy Phase I**

Cambodia's *Pentagonal Strategy Phase I (2023-2028)*[3] *for Growth, Employment, Equity, and Sustainability: Building the Foundation Towards Realizing the Cambodia Vision 250*, which developed on the achievements of the Triangular Strategy and the Four-phase of Rectangular Strategy in the previous 25 years, a flagship policy of the Royal Government of Cambodia of the Seventh Legislature of the National Assembly, sets the groundwork for achieving Cambodia's Vision 2050, emphasizes multiple pillars for national growth to ensure that in the next 25 years (1) Cambodia becomes a vibrant society that sustains everlasting peace, political stability and strong public order, (2) Cambodia becomes a high-income and resilient economy

[3] *RGC (2023), "Cambodia's* Pentagonal Strategy Phase I *2023-2028"*

that is efficient, competitive, open, inclusive and sustainable, (3) Cambodian people are highly knowledgeable and have at least one skill in life with perseverance, entrepreneurial spirit, innovation and high morality, (4) Cambodian people live in dignity and happiness, and (5) Cambodia becomes a country that enjoys harmony, resilience, and inclusivity of physical and natural environment and has a good balance between development and environmental conservation. The strategy adopts five keys priority, namely People, Road, Water, Electricity, and Technology, in the consequential priority. Technology has put strong emphasis on digital innovation, scientific research, and skills development as critical to advancing the economy and modernizing society. To achieve the set forth objectives, the Pentagonal Strategy has rolled out five strategic pentagons outlined as *Pentagon 1*- Human Capital Development, *Pentagon 2*- Economic Diversification and Competitiveness Enhancement, *Pentagon 3*- Development of Private Sector and Employment, *Pentagon 4*- Resilient, Sustainable and Inclusive Development and *Pentagon 5*- Development of Digital Economy and Society. The technology and R&D goals within this framework aim to bolster digital infrastructure, promote a knowledge-based economy, and encourage digital innovation systems. Specific objectives include developing a digital government, encouraging digital business, and fostering an environment conducive to digital innovation. Moreover, the government aims to create new economic growth sectors and foster technical and vocational skills aligned with the demands of modern industry, further underpinning the importance of human capital development as foundational to R&D growth. The Pentagonal Strategy has also defined mechanisms to promote research such as Under the pentagon 1, the strategy to strengthen the governance of higher education institutions, promoting R&D and innovation, and promoting public private partnership. Under pentagon 4, the strategy seeks to promote scientific research in the agricultural sector, and under pentagon 5, the strategy sets to strengthen digital innovation capacity through development of human resources and talents in science, technology and innovation, as well as improvements of R&D and innovation in education.

- **National Strategic Development Plan**

The Royal Government of Cambodia will roll out the National Strategic Development Plan (NSDP)2024-2028 to contribute to the implementation of and closely align with the Pentagonal Strategy Phase 1 and to achieve the Cambodian sustainable development goal as well as Cambodia's Vision. However, this new phase document is still in a work-in-progress, and

expect to release in 2024 or early 2025. The NSDP 2019-2023[4], the previous phase, was a key document guiding Cambodia's efforts in alignment with Rectangular Strategy Phase 4. It outlined strategies include (1) Acceleration of governance reform: the core of the Rectangular Strategy; (2) overarching environment for implementing the strategy; (3) human resource development; (4) economic diversification; (5) private sector and job development; and (6) inclusive and sustainable development. In terms of R&D, this document aimed to promote science and technology advancement, enhance productivity, promote innovation and enhance skills workforce underscoring the collaborative efforts with relevant national and international actors to advance R&D initiatives in the key sectors including agriculture, environment, green economy and so forth. One of the key highlights of the strategy is to enable effective and efficient research at the national level, covering the promotion of research, technology transfer, and the creation of research funds, and strengthening of research institutions, the implementation of research programmes, and the commercialisation of results.

- **Cambodia Sustainable Development Goals**

The Cambodian Sustainable Development Goals (CSDGs)[5], derived from the Global Sustainable Development Goal framework, address the efforts of the Royal Government of Cambodia to achieve sustainable development goals by 2030, coalescing the efforts with the Pentagonal Strategy and National Strategic Development Plan. Unlike the standard global SDGs, Cambodia has integrated its own unique 18th goal related to mine action and other explosive remnants of war in addition to the standard 17 goals. In terms of R&D, the strategy supports the integration of innovation and technology-driven solutions to achieve the goals such as Quality Education (Goal 4), Decent Work and Economic Growth (Goal 8), and Industry, Innovation, and Infrastructure (Goal 9), all of which are critical for advancing R&D efforts. It contains 105 targets, two of which have research embedded in the framework, one of which aims to increase investment in agricultural research to "end hunger, achieve food security, and promote sustainable agriculture" (CSDG 2), and another one is to enhance scientific research, increase the number of researchers, and promote public and private research to achieve CSDG 9: "Build resilient infrastructure, promote inclusive and sustainable

[4] *RGC (2019), "National Strategic Development Plan 2019-2023"*
[5] *RGC (2018), "The Cambodian Sustainable Development Goals"*

industrialization, and foster innovation". In addition to the overarching national strategies, several sectoral strategies are relevant for building national research capabilities.

2.2 The Sectoral Policies

There are a wide range of sectoral policies and regulation frameworks developed to promote and empower the development of each sector, which in general is in alignment with Cambodia's national core policies. These policies directly and indirectly support the advancement of R&D efforts in the country. The objectives of these policies are to harness the potential of R&D to leverage innovative capabilities, foster economic development, and address the challenges faced by their sectors.

o The National STI Policy 2020-2030

The National STI Policy 2020-2030[6], approved in 2019, aims to strengthen the national STI capabilities, including institutions and human resources, and improve the STI ecosystem.The strategies developed in the framework of the policy seek to:

- Develop STI human resources in terms of quantity, quality, and composition while accounting for ethics and gender equality;
- Develop an STI environment that maximises the potential of human resources;
- Promote efficiency and effectiveness of R&D by adapting the use of technologies to the Cambodian needs and by learning from technologies being developed abroad;
- Develop a dynamic and robust innovation ecosystem able to synthesise technologies and engineering in priority industries; enable businesses to participate in international markets; and enhance productivity;
- Develop an STI culture to increase trust in the application of national technologies.

o Cambodia's STI Roadmap 2030

Understanding the importance of Science, Technology and Innovation, the Government of Cambodia has established Ministry of Industry, Science, Technology & Innovation (MISTI) and the National Council of Science, Technology and Innovation (NCSTI) to oversee and give the direction of the efforts to advance STI in Cambodia. These two institutions are mandated,

[6] *RGC (2019), The National STI Policy 2020-2030*

at the national level, to promote STI and lead STI transformation. They provide guidance to define a clear vision and objectives for STI strategies that enable the country to reach the goals set for 2030 and 2050. Currently, MISTI under guidance of NCSTI, has established and disseminated numerous policy and regulatory frameworks that drive STI transformation at the national level:

First and foremost, the Cambodia's STI Roadmap 2030[7], developed by MISTI and enacted in 2021, aims to support the implementation of the National STI Policy. This roadmap aims to strengthen national technological capabilities and improve innovation performance of Cambodia as these will be critical to achieve the ambitious vision of the Royal Government of Cambodia to become an upper-middle-income economy by 2030 and a high-income economy by 2050. Science, technology and innovation (STI) is considered to be a pivotal driver to shift the economic development pathway from a focus on traditional growth to support for inclusive and sustainable growth. ST| will enable and accelerate the structural transformations required to increase national prosperity, peace, security, safety and socioeconomic development and to improve quality of life. The roadmap is developed on five pillars, with one focusing specifically on research. The five pillars include:

- **Enhancing the governance of the STI system:** STI governance is key and has been recently restructured with the creation of MISTI in March 2020. It will be important to consolidate this new structure, while reducing fragmentation and breaking down silos. This will require clarifying the role of MISTI and other stakeholders, strengthen awareness and capacities of the Government to implement the National STI Policy, and monitoring and evaluating advances made in the promotion of STI.
- **Build human capital in STI:** Current demand for innovation is low and there is a limited scientific and entrepreneurship culture. It will be critical to promote scientific, digital and entrepreneurship literacy, and the technological readiness of the youth, starting in basic education. Teaching science, technology and innovation from very early age will help create a new generation of scientists and innovators. Skills in science technology engineering and mathematics (STEM) will also need to be promoted in higher education. In addition, there is room for strengthening

[7] *RGC (2021), "Cambodia's Science, Technology and Innovation Roadmap 2030"*

teaching and collaboration with the private sector in technical and vocational education and training (TVET) institutions. Strategic development of human resources is at the foundation of promoting STI.

- **Strengthening research capacity and quality:** Build the capacity of the higher education and research system to conduct high quality R&D activities of national interest and in priority sectors is much needed. This will require developing a national research agenda with the academic community and in close collaboration with the private sector, providing funding to support excellent science and the internationalization of research and encourage collaboration with the private sector.
- **Increasing collaboration and networking between different actors**: Innovation comes from the exchange of ideas, across different people, organizations, sectors and scientific domains. Intermediary organizations and knowledge broker institutions are essential to facilitate such exchanges. Hence, it will be critical to promote and sustain incubation and acceleration facilities, technological platforms open to private sector and innovative clusters fostering collaboration to support innovation in small and medium-sized enterprises (SMEs) and enhance their absorptive capacities.
- **Fostering an enabling ecosystem for building absorptive capacities in firms and attracting investments in STI:** Supporting innovation capabilities and increasing the absorptive capacities of firms requires financing and promoting intermediary structures that nurture new firms (start-ups), support technology transfer and promote domestic technologies. It needs to be fostered by institutions that provide technology and quality (norms and certification) services to firms. It also requires increasing access to finance for innovation activities, including through leveraging investments from the private sector and attracting funding from donors. Incentivizing foreign direct investment (FDI) that supports the building of domestic technological capabilities, facilitating the importing of technology equipment and promoting intellectual property rights are additional avenues for fostering an enabling ecosystem for innovation.

- **National Research Agenda**

The **National Research Agenda 2025**[8] of Cambodia, launched by the Ministry of Industry, Science, Technology, and Innovation (MISTI), represents a key step toward transforming Cambodia's research landscape into a vibrant research ecosystem. The National Research Agenda is built upon the direction guided in the Cambodia's STI Roadmap 2030. This agenda aims to guide research efforts toward high-priority sectors that will contribute to national goals such as sustainability, technological development, and economic resilience. By addressing essential areas—like energy, food security, digital health, education, and environmental sustainability—the agenda seeks to advance Cambodia's economic and social progress in line with its broader Vision 2030 and Vision 2050 goals.

The agenda identifies several core research priorities, each targeted to address specific development needs in Cambodia:

- **'Local food':** 70 percent of Cambodia food consumption is produced locally
- **'Reliable Energy Supply'**: 90 percent of energy consumption is generated locally
- **'Quality Education'**: Education meets international quality standards
- **'Electronic and mechanical spare parts'**: Cambodia exports 70 percent of the electronic and mechanical spare parts produced in the country
- **'Cloud-based services':** Cambodia's cloud-based services development is on par with ASEAN
- **'Electricity and potable water'**: All Cambodians have access to reliable electricity and safe potable water
- **'Carbon neutrality':** Cambodia becomes a carbon neutral country
- **'Digitally-enhanced health'**: All Cambodians have access to digitally-enhanced health services

The National Research Agenda 2025 serves as a comprehensive framework to mobilize resources, build institutional capacity, and foster partnerships across sectors. Its strategic objectives include:

[8] *RGC (2023), "National Research Agenda 2025"*

1. **Investing in research to support the eight research missions**. This will include establishing a national research foundation and a national research fund to support investments in research and guide such investments towards the eight research missions.

2. **Strengthening the role and capacities of public research institutions** through the establishment of a national research system, national research fund, centers of excellence in research, and a national research publication platform.

3**. Supporting research careers.** This will require recognising the research profession, introducing a research career framework and establishing an attractive system of incentives for researchers to support research careers in the public and private sectors.

4. **Incentivising research activities and collaboration.** This will require enhancing coordination among research promoting institutions, setting up an adequate research management system; incentivising industry-academia-government and international collaborative research; building the absorptive capacity of firms and their ability to conduct R&D and innovation activities; establishing key infrastructure to support technology transfer and adoption; exploring means to incentivise R&D investments through tax incentives; and supporting greater enforcement of intellectual property rights.

These missions were co-created through a multi-stakeholder process and focus on research activities and resources on the achievement of national developmental goals, including those stated in the Rectangular Strategy Phase IV, the National Strategic Development Plan (NSDP) 2019-2023, and the Cambodia Sustainable Development Goals (CSDG) Framework for 2016-2030.

- **Six Technology Roadmaps**

MISTI has also produced and disseminated technology roadmaps on six priority sectors, guided and rectified by the formal meeting of NCSTI. These six priority sectors include Agriculture[9], Education[10], Health[11], Energy[12], Tourism[13], and Digital[14]. These roadmaps are a comprehensive policy document navigating the efforts toward the dynamic landscape of technology in the

[9] *Ministry of Industry, Science, Technology and Innovation, MISTI, (2022), "AgriTech Roadmap"*
[10] *MISTI (2022), "EduTech Roadmap"*
[11] *MISTI (2022), "HealthTech Roadmap"*
[12] *MISTI (2023), "EnergyTech Roadmap"*
[13] *MISTI (2023), "TourismTech Roadmap"*
[14] *MISTI (2023), "DigitalTech Roadmap"*

priority sectors in the pursuit of socioeconomic development and a sustainable future. These roadmaps aim to utilize the power of Science and Technology to advance the six sectors to be more competitive and reliable, tackle national challenges, and most importantly significantly contribute to socioeconomic development. Moreover, these roadmaps serve as a cornerstone to help Cambodia achieve the 2050 vision. The roadmaps have specifically outlined the important role of R&D in achieving the goals. For example, in the energy technology roadmap, R&D is indicated to be very important in exploring new sources of energy and encouraged to invest more as it can strengthen scientific-based and technological capabilities and bring out more innovation.

- **Master Plan for Research Development in the Education Sector 2011-2015**

Master Plan for Research Development in the Education Sector[15] approved in 2010 aimed to create stronger links between education and research to increase its contribution to the country's development. The policy sought to enhance the research culture to promote cooperation with international networks, expand innovation activities and strengthen the quality of higher education. A year later, the Ministry of Education, Youth and Sport (MoEYS) adopted the Master Plan for Research Development in the Education Sector for 2011-2015. The plan aimed to promote research, research results dissemination, and research ethics.

In the same period, MoEYS developed the Higher Education Quality and Capacity Improvement Project funded by the World Bank. By supporting HEIs around the country, the Government aimed to increase teaching and research quality, access to higher education, and retention rates.

- **Education Strategic Plan 2019–2023**

MoEYS is implementing the Education Strategic Plan 2019-2023[16], which updates the 2014-2018 strategy, to support the three overarching national strategies, namely the NSDP, the RS-IV, and the CSDGs Framework. In terms of research, the overall objective of this Plan is to improve research quality; promote research among HEIs; foster continuous development

[15] *Ministry of Education, Youth and Sports, MoEYS, (2010), "Master Plan for Research Development in the Education Sector"*
[16] *MoEYS (2019), "Education Strategic Plan 2019-2023"*

through collaborations, internationalisation, and training; and provide financial support through fund mechanisms such as funds for research, scholarships, and training.

Specific objectives are defined for each education sub- section: Early childhood, primary, secondary, higher, non-formal, youth development, physical education, and sport. This policy aims to improve access to education for young Cambodians and enhance the quality of education services.

The Plan seeks to reinforce research among HEIs by supporting research on teaching methods and the development of research-based policies. The Government also aims to establish a research fund for higher education and to develop partnerships to improve research capacity. The Education Research Council is one of the mechanisms to reform academic management. It intends to guide research on education practices, and support policymakers and research institutions in designing policies and conducting research, respectively. The Plan also highlights the role of professors to conduct research on improving teaching methods, which, in turn can improve the quality of their work.

- **Policy on Higher Education Vision 2030**

The Policy on Higher Education Vision 2030[17] establishes a long-term objective to improve the quality of higher education through good governance and mechanisms that ensure access to quality higher education. Broader access would fulfil the needs of the Cambodian labour market and respond to challenges related to socio-economic development. MoEYS also seeks to develop a programme to promote equity in access to higher education and to enhance skills development and knowledge excellence. Furthermore, the Policy aims to improve economic development through improved learning, teaching and quality of research systems, and to build a governance system that would allow for better management of relevant institutions. Regarding research, the Policy aims to increase the quality of research, promote collaborations with foreign universities, foster staff and students' engagement in the development of a national research culture, and strengthen research and innovation capacity.

[17] *MoEYS (2014), "The Policy on Higher Education Vision 2030"*

o Cambodian Information and Communication Technology Masterplan 2020

The Cambodian Information and Communication Technology (ICT) Masterplan 2020[18] aims to establish Cambodia among the top countries in South-East Asia on the ICT-related World Economic Forum indexes. The plan is divided into four main categories: empowering people, ensuring connectivity, enhancing capabilities, and enhancing e-services.

R&D governance is integrated as part of the enhancing capabilities section of the Masterplan. The Masterplan emphasises the need to develop the ICT industry and mentions that a research network is key for national ICT infrastructure to be developed further. To this end, it recommends creating pilot research networks in large cities. The Masterplan also notes the challenges by regarding the R&D environment, including the lack of research culture, R&D facilities, funds, equipment and, more generally, human resources.

o Digital Economy and Society Policy Framework 2021-2035

The Government has recently developed a Digital Economy and Society Policy Framework[19] to address the challenges and opportunities emerging from the Fourth Industrial Revolution and crises such as the COVID-19 pandemic. The policy framework focuses on the digital transformation of the economy and society. It highlights the challenge of becoming more resilient towards the future which can be addressed through digital strategies while pointing out concerns regarding the development of databases and digital platforms. To transform itself into a digital economy and society, Cambodia will require an enabling infrastructure, reliability and confidence in the digital system, citizens, government, and businesses. The following are the actions of the policy framework focusing on research:

- Participate in cooperative and international digital research initiatives;
- Develop R&D capacity-building funds in ICT;
- Build the capacity of actors on digital adoption and transformation through research and digital technologies;
- Foster digital research and innovation in HEIs, vocational training institutions and research centres;

[18] *Ministry of Posts and Telecommunication (2014), "The Cambodian Information and Communication Technology Masterplan 2020"*

[19] *Supreme National Economic Council (2021), "Digital Economy and Society Policy Framework 2021-2035"*

- Foster R&D and innovation through partnership with businesses which would enable data and knowledge exchanges, including the development of a digital research and innovation centre and support funds;
- Strengthen the digitalisation of documents in Khmer language to allow the identification of the language in search and facilitate data analysis;
- Develop a national strategy promoting R&D and innovation;
- Improve the quality of public research centres on digital R&D, develop a digital innovation fund to enhance businesses' investments in the sector, and strengthen policy implementation on STI to promote more conducive R&D and innovation environments.

- **Industrial Development Policy and Plan 2015-2025**

The Cambodia Industrial Development Policy and Plan 2015-2025[20] is the main policy document focusing on the future of Cambodia's national industry.The Policy and Plan seeks to change the industrial structure by strengthening it, increasing the volume of exports, diversifying exported goods, and promoting SMEs. There are five priority sectors set by the Government:

1. New industries or manufacturing ventures with high value-added products, not only on consumer products but also machinery, mechanic, electronic, electric, and transport assembly, and natural resource processing;
2. SMEs in all sectors, especially in drugs and medical equipment, construction, packaging, furniture manufacturing, and industrial equipment;
3. Agro-industrial production for export anddomestic markets;
4. Supporting industries for agriculture, tourism, textile, regional production chains linked to the provision of raw materials, especially for the garment sector, and production of spare parts and semi-finished products;
5. Industries supporting regional production lines of ICT, energy, heavy industries, cultural and traditional handicraft, and green technology.

On the aspect of research, the Industrial Development Policy and Plan 2015-2025 incentivises investment in research projects and proposes the creation of research funds to support this

[20] *Council for the Development of Cambodia, CDC, (2015), "Industrial Development Policy and Plan 2015-2025"*

endeavor. The plan also seeks to strengthen research capacity according to the demand for industrial technologies. To improve industrial relations, it recommends exploring solutions to address industrial disputes. Regarding research at HEIs, it mentions the need to increase R&D quality by improving equipment quality and availability. Lastly, the plan proposes the creation of scientific and technological parks and a public research institute.

- **Agricultural Sector Strategic Development Plan 2019-2023**

Agricultural Sector Strategic Development Plan 2019-2023[21] is developed and implemented by the Ministry of Agriculture, Forestry, and Fisheries. This policy is particularly aligned with the core policy Rectangular Strategy Phase 4 of the Government in the 6th legislature. The Plan focuses on different factors to improve agriculture in the future. The objectives relate to productivity, commercialization, and diversification of agriculture; animal health and production; aquaculture and fisheries development and management; sustainable forestry and wildlife resources; human resources and support services development and management. This policy has embedded R&D in its key elements within the development plans such as improving crop production, yield, quality, and resilience to climate change through developing better and resilient crop varieties, improving soil quality, and promoting sustainable farming practices. Furthermore, promoting horticulture such as in the areas of post-harvest technology and food safety, creating higher added value for the market in the region and globally.

- **Cambodia's Circular Economy Strategy and Action Plan**

This policy[22] is initiated and rolled out by the Ministry of Environment in 2021, aiming to transition the country from a linear economy to a circular economy model to achieve its sustainable development goal and the fourth phase of the government's rectangular strategy. The strategy puts a strong emphasis on sustainable resource use, resource efficiency, and waste reduction. This strategy outlines its key objectives to promote sustainable production and energy use, enhance waste collection and recycling, and recycling, and, importantly, foster environmental education. R&D plays an important role in this policy, such as creating effective and technology-based waste management solutions, particularly in waste recycling and renewable energy. Innovation, which can be enhanced by the R&D program, is encouraged in many areas such as eco-designed and sustainable materials. This strategy also aims to address

[21] *Ministry of Agriculture, Forestry and Fisheries (2019), "Agricultural Sector Strategic Development Plan 2019-2023"*
[22] *Ministry of Environment, MOE, (2021), "Cambodia's Circular Economy Strategy and Action Plan"*

the challenges, including a lack of infrastructure, regulatory gaps, and raise awareness and capacity building across sectors and relevant stakeholders.

- **Cambodia's Climate Change Strategic Plan 2014- 2023**

Cambodia's Climate Change Strategic Plan 2014-2023[23] is developed by Ministry of Environment as a country's primary framework to address the climate change issues faced by many sectors and people in Cambodia through a low-carbon strategy and build climate resilient capacities across sectors, supporting sustainable development, and climate-oriented policies that align with national growth and global commitments to combat climate change. In this regard, this policy framework aims to address a gap in knowledge, capacity, and science-based decision-making in responding to climate change. This Plan aims to incorporate climate change into the existing national programmes and frameworks, and complement policy gaps by aligning itself with different sectoral climate change strategic plans developed by other line ministries and national agencies to reduce vulnerability and increase public participation in shifting to low-carbon development. This strategic plan has embedded R&D in its strategic plan, particularly in fostering resiliency and adaptation through innovative technology. The Plan is structured into three phases: immediate, medium, and long-term, with research being the focus of the third phase (2019-2023).

- **Third Health Strategic Plan 2016-2020**

The Ministry of Health (MoH) developed the Third Health Strategic Plan 2016-2020[24] as a strategic management tool to guide health institutions in managing their resources and implementing health strategies. Research is one of the strategic objectives described in the Plan: it seeks to promote research in the health sector, increase research capacity, and improve available ICT infrastructure for research. Health information system is a key strategic objective aiming at enhancing the reliability and accuracy of data and information that can promote health research. This strategic objective outlines the activities to promote a better use of research findings.

[23] *MOE (2013), "Cambodia's Climate Change Strategic Plan 2014-2023"*

[24] *Ministry of Health, MOH, (2016), "Third Health Strategic Plan 2016-2020"*

- **New Law on Investment**

The Council for the Development of Cambodia drafted the new investment law[25] in February 2021, and it was promulgated in 15 October 2021.The Law aims to develop a legal framework to enhance domestic and foreign investment based on principles of transparency, predictability, and favourability. This new law, through the generous incentive schemes, aims to attract and promote quality, effective and efficient investments in specific sectors that have a high potential contributing to socio-economic development, including high-tech industries conducting R&D and innovation activities. Under this Law, R&D and innovation activities are entitled to investment incentives. The incentives are either in the form of income tax exemption (for up to 9 years) or special depreciation (up to 200% of specific expenses) for the Qualified Investment Project (QIP), There are also additional incentives and special incentives for any specific sector and investment activities that deems having a high potential that contributes to Cambodia's national development.

The following investment sectors and activities are entitled to receive the investment incentives, including:

1. High-tech industries involving innovation or R&D
2. Innovative or highly competitive new industries or manufacturing with high added value
3. Industries supplying regional and global production chains
4. Industries supporting agriculture, tourism, manufacturing regional and global production chains and supply chains
5. Electrical and electronic industries
6. Spart parts, assembly and installation industries
7. Mechanical and machinery industries
8. Agriculture, agro-industry, agro-processing and food processing industries serving domestic market or export
9. SMEs in priority sectors and cluster, industrial parks, and STI parks
10. Tourism
11. Special economic zones
12. Digital industries

[25] *CDC (2021), "New Law on Investment"*

13. Education, vocational training and productivity promotion
14. Health
15. Physical infrastructure
16. Logistics
17. Environmental management and protection, biodiversity conservation and circular economy
18. Green energy, technology contributing to climate change adaptation and mitigation
19. Other sectors deemed by the Royal Government of Cambodia to have potential for socio-economic development

In conclusion, Royal Government of Cambodia has prioritized scientific and technological progress as the catalyze to promote socio-economic development and to tackle the national challenges, and to achieve the Cambodia's Sustainable Development Goals, in align with the global (SDG), and most importantly to realize the government's ambitious vision to transform current Cambodia's economy, labor's based, to become upper-middle income country by 2030 and high-income country by 2050, skill-based and innovation led economy. To achieve these goals, Research and Development is the cornerstone for the socio-economic development, enhancing innovation capacities, promoting startup and entrepreneurship, strengthening competitiveness, developing skill-based labor, and enhancing innovative solutions to tackle national challenges such as climate change and global warming. These policies provide a foundational framework that the Cambodia's R&D Management System, initiated by Ministry of Industry, Science, Technology and innovation, can build upon, especially in advancing digital and technological innovation, resource allocation, and cross-sectoral collaboration. Policies such as the National Science, Technology, and Innovation Policy, Cambodia's STI Roadmap 2030, National Research Agenda, particularly the sectoral polices overarching prioritized sectors of Cambodia including the Agricultural Sector Strategic Development Plan, and the Circular Economy Strategy reflect Cambodia's commitment to sustainable development and economic resilience, emphasizing a need for cohesive R&D efforts across sectors.

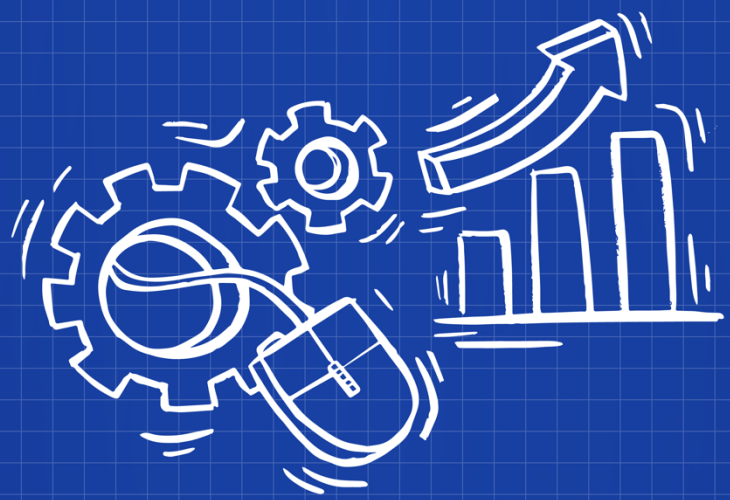
For the Cambodia's R&D Management System, these policies imply a strategic advantage in terms of leveraging governmental priorities and resources to support data collection, knowledge sharing, and technology transfer within the national R&D landscape. With a

systematized digital framework, the system could help streamline ongoing efforts in agriculture, environmental sustainability, and climate adaptation by centralizing data and enabling efficient policy monitoring. Additionally, by aligning with Cambodia's sustainable development priorities, the system can provide a platform for public-private partnerships, international collaboration, and investment in priority areas, addressing resource limitations and enhancing transparency in R&D project tracking.

The successful integration of this R&D Management System can thereby enhance Cambodia's capacity for innovation, support efficient policy implementation, and contribute to achieving national goals outlined in strategic plans such as the National Strategic Development Plan and the Cambodia Sustainable Development Goals.

CHAPTER 3

DEMAND ANALYSIS



3.1 Current R&D management system

Research environments and practices are fundamental to the pursuit of scientific knowledge and discovery. These encompass the physical and virtual settings in which research is conducted, the methodologies employed, and the ethical principles adhered to throughout the research process. A well-structured research environment, coupled with established best practices, is critical for ensuring the quality and reliability of research outcomes.

In the recent decades, no country has enjoyed socioeconomic growth without strengthening national science and technology competitiveness, particularly through the investment on research and development (R&D) in their development agenda. Statistical studies illustrated the compelling evidences that the more a nation correctly invests in R&D, the more develop nation is. In fact, knowledge-based economy shall have strong scientific foundation coming from R&D, which is a critical prerequisite for the scientific and technological progress. Investing in R&D is very crucial as it not only leverages the national innovation system, but also directly contributes to socioeconomic prosperity in sustainable, inclusive, and resilient manner.

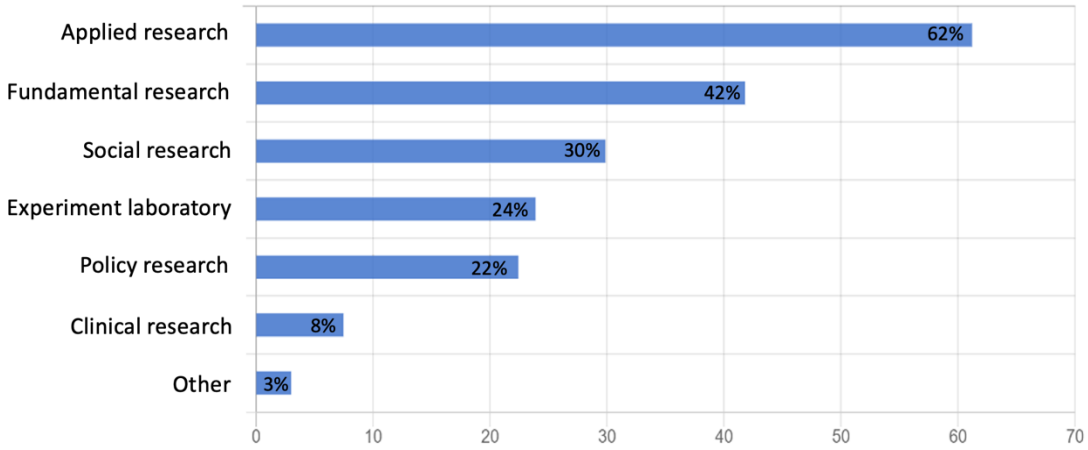
The development of national research capabilities can be benefit virtually all sectors of Cambodian economy and society. This requires a self-reliant national research ecosystem, with solid institutional support and that encourage dynamic collaborations between the public and private sector, universities and research institutes, civil society, and development partners.

The Research Ecosystem of Cambodia report[26] provides and outlines several recommendations to strengthen research capacity and quality based on the analysis of nine building blocks, the following recommendations are proposed: Align research topics with national developmental needs; introduce a research fund to finance the national research agenda; clarify the roles, mandates, means, objectives and budgets of government research institutes; select some publicly-funded research and training organizations to become centres of excellence in research, providing them with adequate funding; introduce an attractive research career system and incentives for researchers; incentivize the private sector to conduct research in collaboration with academia; develop strong international university networks; and inform and train policymakers to integrate research into policymaking.

A comprehensive survey conducted across a wide range of research disciplines presents a detailed and in-depth overview of the landscape of Cambodia. Figure 3 shows that Applied research takes the lead, with a substantial 61.9% of respondents actively engaged in this field. This category encompasses research efforts aimed at solving real-world problems and innovating solutions to address pressing issues in various sector. These findings underscore the significant impact and relevance of applied research in today's knowledge-driven society.

[26] The Research Ecosystem of Cambodia, https://misti.gov.kh/public/file/202302151676477042.pdf

Figure 3: Nature of research project

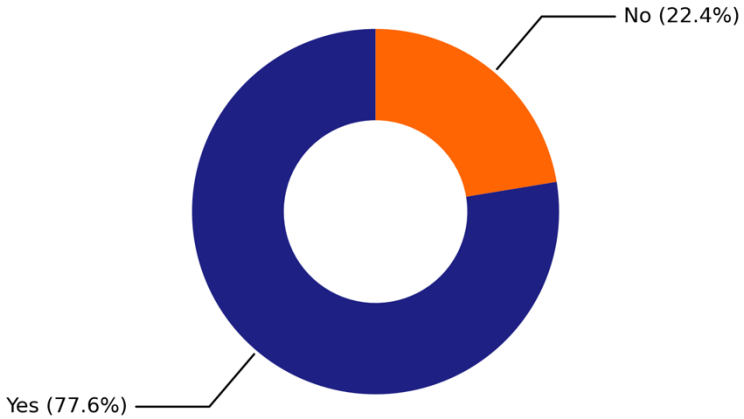


Fundamental research emerges as a prominent contender, with 41.79% of participants dedicating their intellectual endeavors to unraveling the mysteries of the universe. Often characterized by its pursuit of knowledge for its own sake, fundamental research lays the foundational groundwork upon which many other fields build their innovations. It serves as the cornerstone of scientific progress, fostering an environment of discovery and curiosity.

Social research, experiment laboratory work, and policy research each claim their distinctive places in the research landscape, representing 29.85%, 23.88%, and 22.39% of participants, respectively. The diversity within these fields indicated the multifaceted nature of contemporary research endeavors, which span from understanding human behavior and societal dynamics to rigorous experimentation and the formulation of policies that shape our collective future. Clinical research, though a smaller subset at 7.46%, plays a critical role in advancing healthcare and medical knowledge. Finally, the survey findings demonstrate that 2.99% of respondents are involved in other research fields, reflecting the intriguing array of specialized niches and interdisciplinary approaches that contribute to the vibrant ecosystem of research and innovation.

As shown in Figure 4, a striking 77.6% of respondents in the survey are actively engaged in collaborative research projects. This high degree of collaboration underscores the interconnected and interdisciplinary nature of modern research endeavors. Researchers from diverse backgrounds and areas of expertise are joining forces to tackle complex challenges, share insights, and foster a vibrant exchange of knowledge. This collaborative spirit is not only driving innovation but also promoting a collective approach to addressing the most pressing issues across various fields of study.

Figure 4: The collaboration on research project

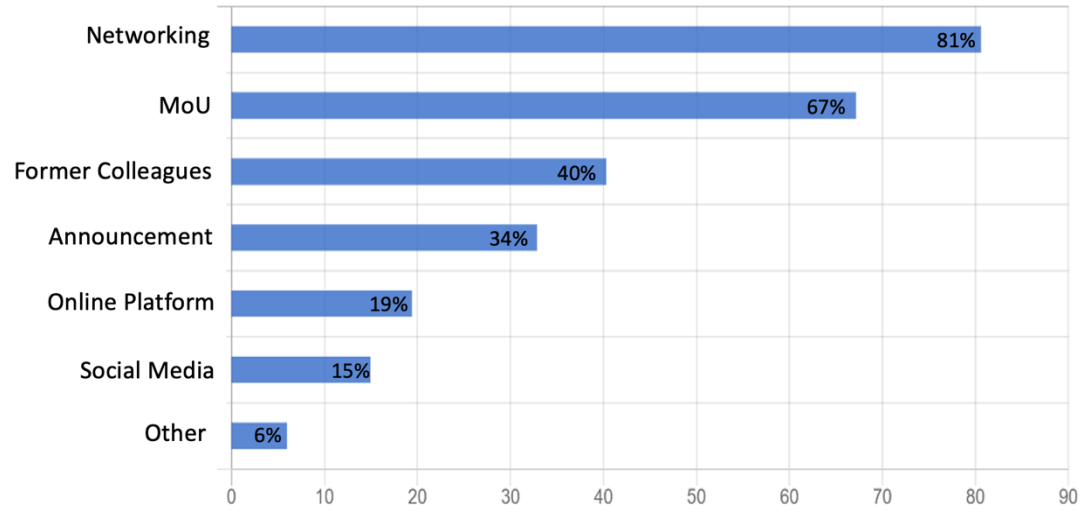


In the realm of research collaboration and partnership as illustrated in Figure 5, the survey reveals intriguing insights into the diverse channels through which researchers connect and pool their expertise. A significant 80.6% of respondents highlight networking as a pivotal means of forging collaborative bonds. This statistic emphasizes the pivotal role of conferences, seminars, and other professional gatherings where researchers converge to share ideas, initiate dialogues, and cultivate partnerships to advance their common scientific goals.

The power of formalized agreements in fostering collaboration is evident, with 67.16% of respondents relying on Memorandums of Understanding (MoUs). These legally binding documents facilitate structured cooperation, often involving institutions or organizations, and signify a commitment to shared research objectives. MoUs provide a solid foundation for collaboration, helping to navigate intellectual property rights, resource allocation, and project responsibilities.

Former colleagues, a source of trust and familiarity, are also integral to the collaborative landscape, as 40.3% of respondents acknowledge. Their shared history and shared vision for research projects make them a valuable asset for establishing productive partnerships. Moreover, the survey sheds light on the role of online platforms, including ResearchGate, LinkedIn, and Google Scholar (19.4%), as well as social media channels such as Facebook, Instagram, Twitter, Telegram, and Line (14.93%), in facilitating connections. These digital realms provide a virtual space where researchers can exchange ideas, explore potential collaborations, and stay updated on the latest developments in their respective fields. Lastly, a notable 5.97% of respondents indicate other means of collaboration, showcasing the endless possibilities that researchers employ to unite their efforts and advance scientific frontiers.

Figure 5: A way in seeking collaboration in the research project



In Figure 6, the survey findings provide a comprehensive overview of the diverse funding sources that researchers rely on to sustain their projects and advance the frontiers of knowledge. Notably, a substantial 62.69% of respondents acknowledge the crucial role of development partners in supporting their research initiatives. These partners often include organizations, institutions, and international bodies that invest in research projects to address pressing global challenges, emphasizing the collaborative nature of contemporary research efforts.

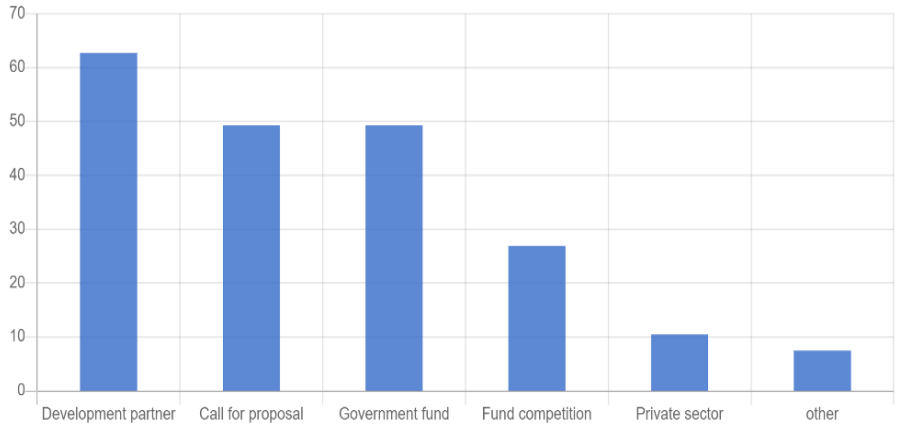
Government funding and calls for proposals are identified by an equal 49.25% of respondents as key avenues for financial support. Government-sponsored research grants, often characterized by their reliability and potential for long-term funding, significantly contribute to scientific advancement. Simultaneously, calls for proposals, which encourage researchers to compete for funding, serve as dynamic platforms for innovative ideas to thrive. Researchers recognize the competitive nature of this channel, which encourages them to develop strong, compelling project proposals.

The study also reveals that 26.87% of participants seek funding through competitive means, such as fund competitions. These competitions foster a sense of innovation and drive, pushing researchers to continuously refine their ideas and present them with a strong emphasis on potential impact. A smaller yet noteworthy 10.45% of respondents look to the private sector for financial backing, recognizing the value of industry collaboration in propelling research innovation and fostering practical applications of their work.

Lastly, the study underscores the ingenuity of researchers, with 7.46% of participants exploring various other unconventional avenues to secure funding. These diverse approaches may encompass partnerships with foundations, crowdfunding efforts, philanthropic donations, or other unique arrangements that reflect the evolving landscape of research financing. Together, these findings illuminate the multifaceted and adaptive nature of funding in the research

community, demonstrating that researchers are actively exploring and leveraging a wide range of resources to support their vital work.

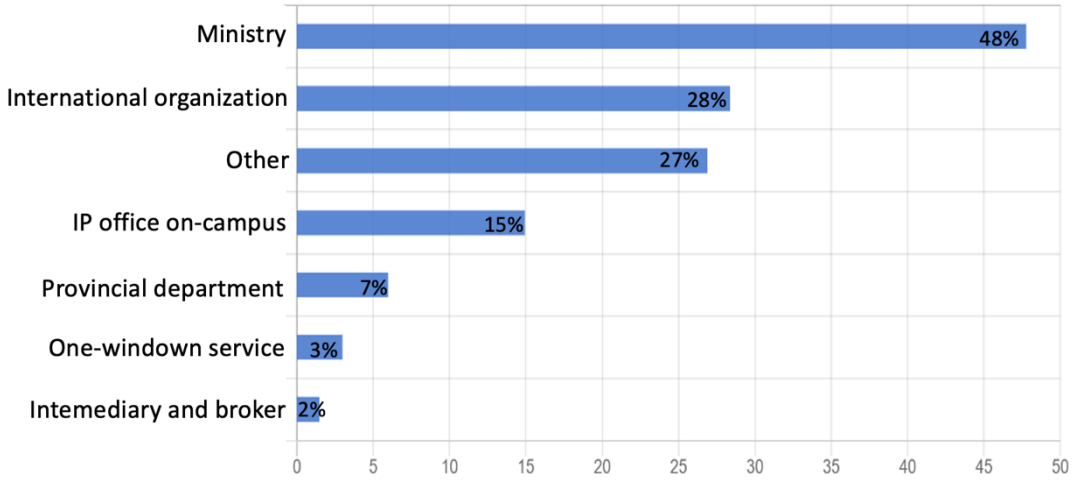
Figure 6: Primary funding source for researcher



As illustrated in 7, the study offers valuable insights into the diverse array of entities and channels through which researchers seek intellectual property (IP) support and services. Notably, a significant 47.76% of respondents highlight the pivotal role of ministries in facilitating the management and protection of intellectual property. These government bodies often play a central role in shaping IP policies and regulations, providing a critical foundation for researchers to navigate the intricacies of IP rights and ownership.

International organizations emerge as another influential source of IP-related support, embraced by 28.36% of respondents. These global entities foster cross-border collaboration and harmonization of IP practices, making them instrumental in addressing the increasingly international nature of intellectual property. Additionally, the survey underscores that 26.87% of participants explore various other avenues for IP services. These diverse approaches may encompass specialized IP offices on university campuses, regional provincial departments, streamlined one-window service centers, and the assistance of intermediaries and brokers. These findings highlight the dynamic and multifaceted landscape of IP support and services, showcasing researchers' adaptability and resourcefulness in safeguarding their intellectual property assets.

Figure 7: The protection of Intellectual property (IP) considerations on research outcome



3.2 Challenges faced in the current management system

Researchers today confront a range of shared challenges that significantly impact their pursuit of knowledge and innovation, shown in Figure 8. Foremost among these challenges is the formidable difficulty in accessing adequate funding, which is experienced by a staggering 68.66% of respondents. This pressing concern highlights the constant struggle researchers face in securing the financial support necessary to bring their ideas to fruition and advance their work.

Inefficiencies in resource allocation emerge as another notable challenge, with 61.19% of researchers grappling with the complex task of optimizing the allocation of resources within their projects. These inefficiencies can hinder progress and innovation, emphasizing the need for streamlined and effective resource management strategies in research settings.

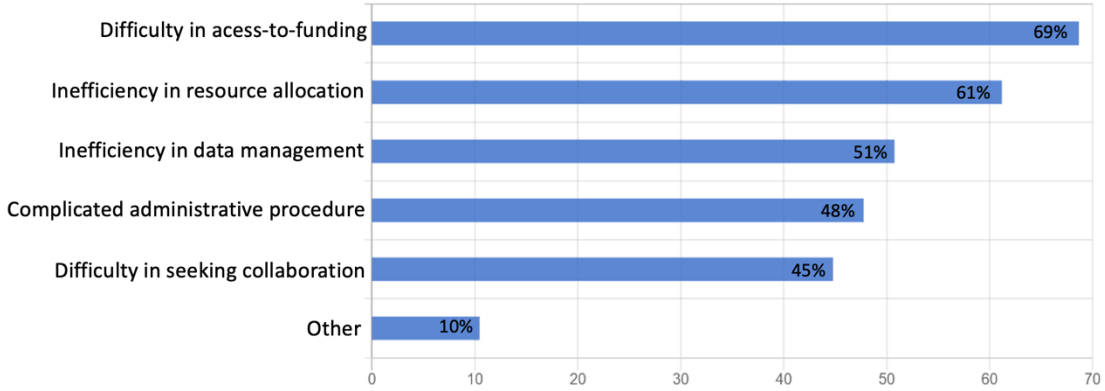
A further challenge, experienced by half of the respondents at 50.75%, pertains to the effective management of research data. In an age of exponential data growth, researchers are often overwhelmed by the volume, diversity, and security considerations associated with their data. This underscores the urgency for comprehensive data management solutions that enable them to harness the full potential of their research findings.

Complicated administrative procedures are a significant impediment faced by 47.76% of researchers. Cumbersome bureaucratic processes can consume valuable time and resources, diverting their focus from their primary research activities. Simplifying administrative procedures and reducing red tape could enhance researchers' productivity and overall efficiency.

Additionally, 44.78% of researchers struggle with the challenge of seeking collaboration effectively. The ability to establish meaningful partnerships and foster interdisciplinary

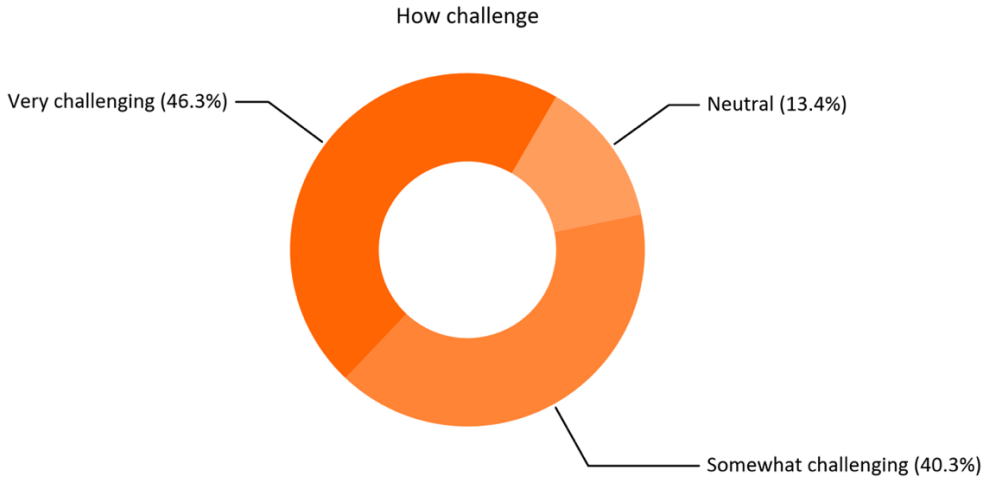
cooperation is vital for tackling complex research problems. Encountering difficulties in this area may hinder the sharing of knowledge and the progress of scientific endeavors. Lastly, 10.45% of respondents report facing various other challenges that, while less common, reflect the diverse and unique hurdles researchers encounter in their pursuit of academic and scientific excellence. These findings collectively underscore the need for targeted solutions and support structures to address these challenges and empower researchers to thrive in their pursuits.

Figure 8: Challenge on current R&D management



When it comes to the degree of difficulty researchers encounter in their work, Figure 9 shows that the survey results reveal a substantial 46.27% of researchers find their challenges to be very demanding, underscoring the significant obstacles they must overcome to advance their research endeavors. Additionally, a substantial 40.30% report that these challenges are somewhat challenging, indicating that a majority of researchers confront varying levels of complexity in their work. In contrast, a smaller but still noteworthy 13.43% maintain a neutral stance, suggesting that a fraction of researchers may have found ways to mitigate or adapt to the challenges they face or may be working in environments with less formidable obstacles. These insights provide valuable context for understanding the range of experiences researchers encounter in their quest for scientific and academic excellence.

Figure 9: Challenging in securing fund for research support



The method by which research staff submit their reports plays a pivotal role in the dissemination of academic and scientific findings. The survey results, depicted in Figure 10, reveal that a significant 43.28% of staff members still rely on manual submission processes, suggesting that a considerable portion of the academic community continues to employ traditional, paper-based means to convey their research results.

In contrast, a noteworthy 31.34% of respondents utilize institutional platforms for report submission, highlighting the growing trend toward digitization and the development of tailored systems within academic institutions. These platforms provide researchers with a streamlined and efficient way to submit their work, offering advantages in terms of accessibility, organization, and data management.

Surprisingly, 19.40% of respondents indicate that the method of report submission is not relevant in their specific roles or fields. This finding suggests that certain research areas or job functions may prioritize other aspects of research work over the mode of report submission, or they may be situated in environments where these practices are less pertinent to their work.

Lastly, a smaller but still notable 5.97% of respondents opt for open online platforms to submit their reports. These platforms have gained prominence as they enable researchers to share their findings with a broader audience, promoting transparency, open access, and knowledge dissemination beyond traditional academic boundaries. These results emphasize the evolving landscape of report submission in the research community and reflect the array of choices available to researchers, tailored to their specific needs and preferences.

Figure 10: Management of R&D annual report on activity and performance

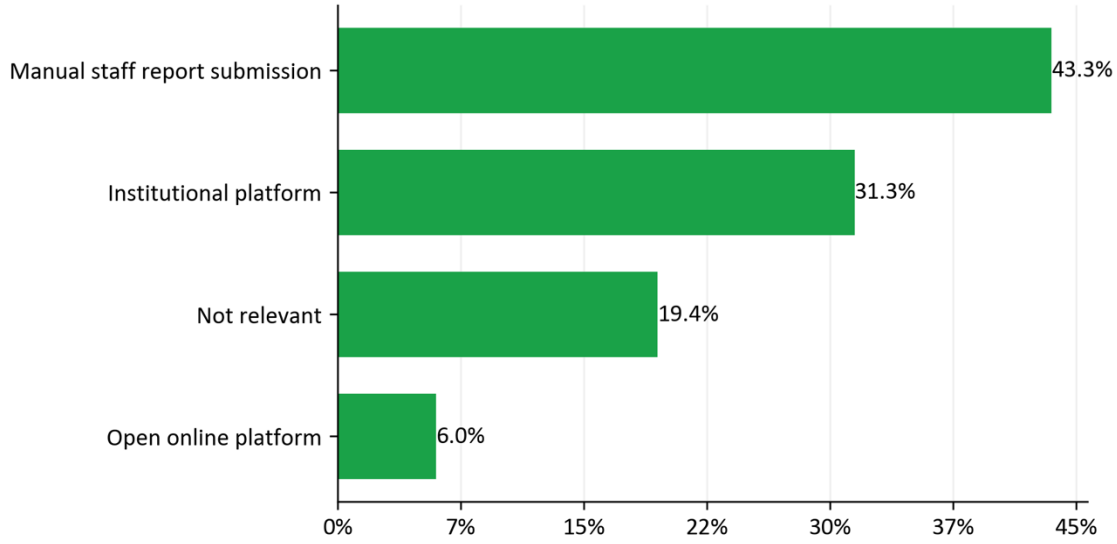


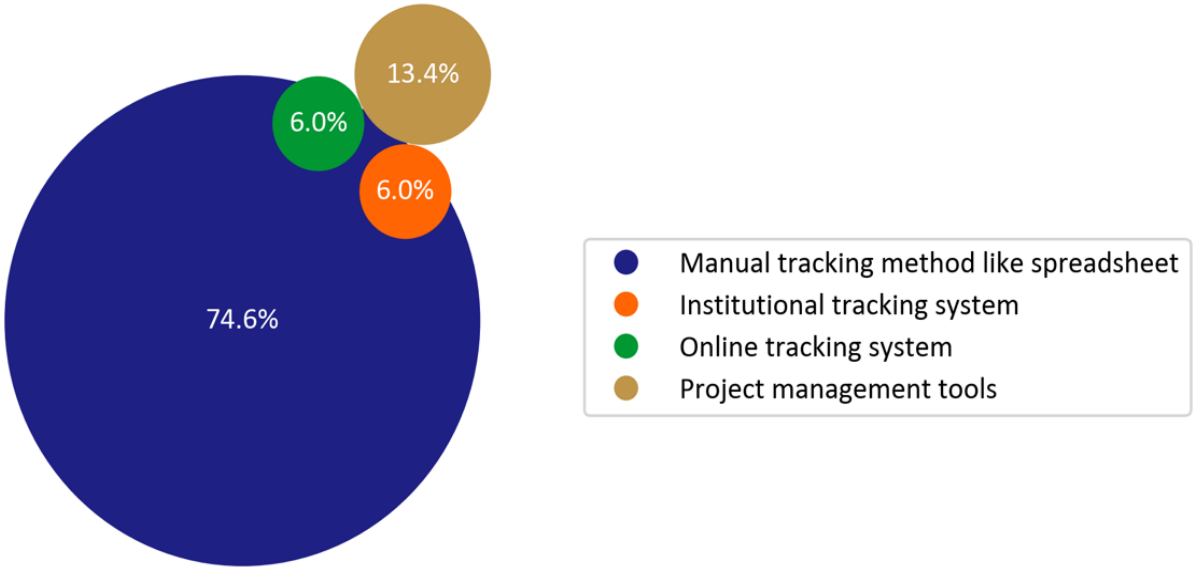
Figure 11 presents the survey findings indicate that a significant 74.63% of respondents rely on manual methods, such as spreadsheets, to monitor their research endeavors. This traditional approach, while prevalent, may come with limitations in terms of efficiency and scalability, as researchers invest substantial effort in maintaining and updating these records.

On the other hand, 13.43% of respondents adopt project management tools to track their research projects. These digital solutions offer more streamlined and collaborative approaches to monitoring research progress, enhancing efficiency, and enabling researchers to manage their tasks and timelines more effectively.

A smaller yet noteworthy 5.97% of participants utilize online tracking systems to oversee their research activities. These web-based platforms offer convenience and accessibility, allowing researchers to monitor their projects from various locations and collaborate with colleagues and stakeholders more seamlessly.

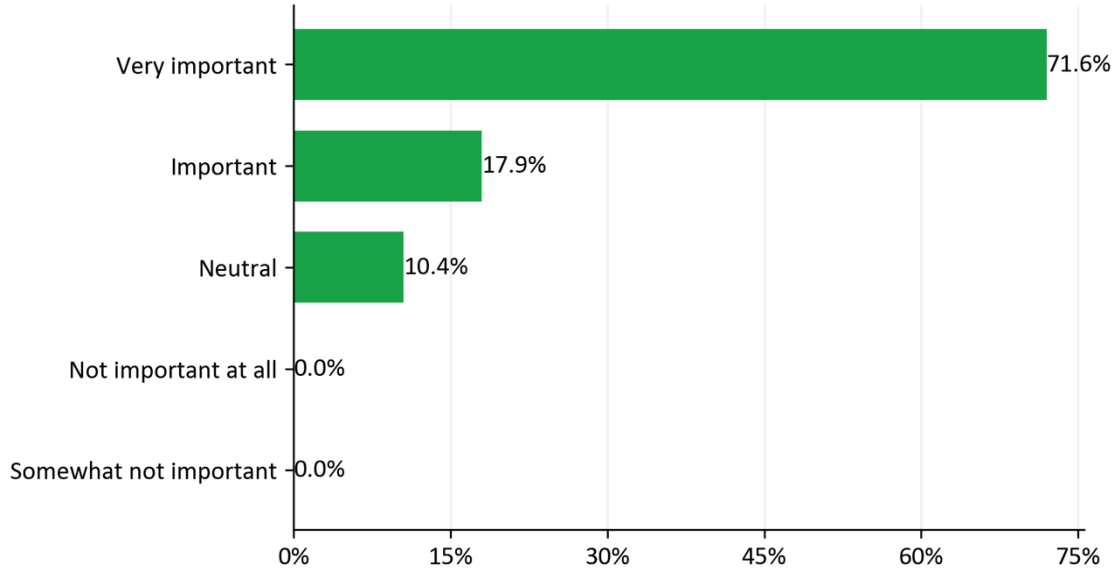
Similarly, 5.97% of respondents turn to institutional tracking systems, which are specialized platforms often provided by their academic or research institutions. These systems can offer a tailored and integrated approach to research tracking, aligning with the specific needs and processes within their organizational contexts. These findings showcase the diverse range of methods and tools researchers employ to manage and monitor their research progress, reflecting a dynamic and adaptable landscape in the research community.

Figure 11: Tool or method for tracking the progress and milestones of research



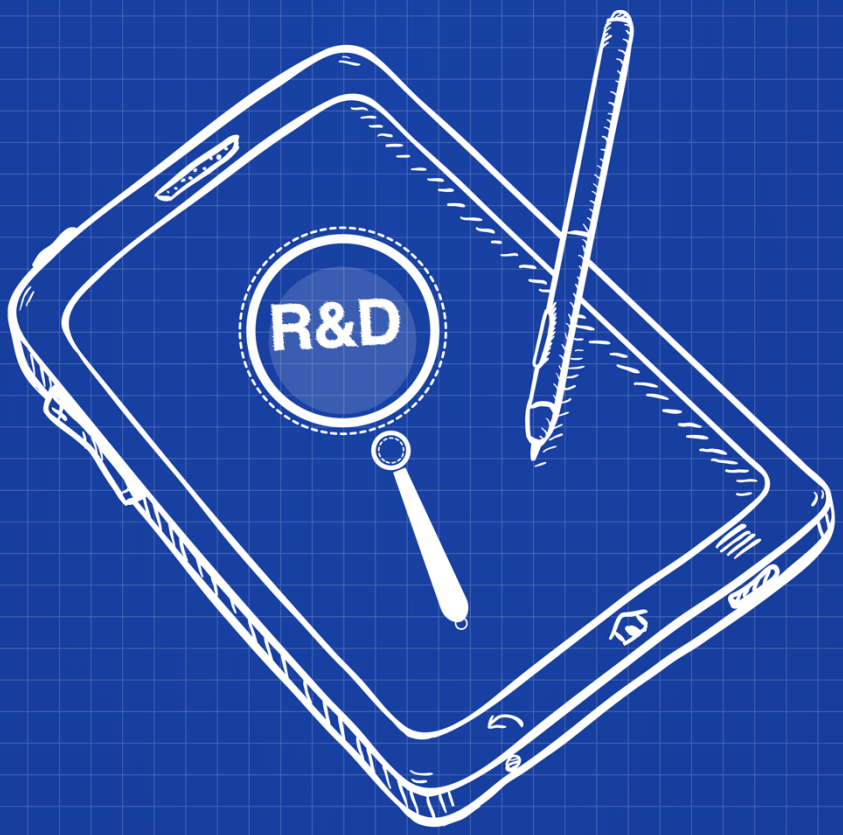
The significance of a National R&D Management system for researchers and research institutes in Cambodia is overwhelmingly evident in the survey results, shown in Figure 12, with a substantial 71.64% of respondents affirming that it is deemed "very important." This resounding endorsement underscores the critical role such a system plays in fostering a conducive environment for research, enhancing collaboration, streamlining resources, and promoting innovation within the nation. An additional 17.91% find it "important," further emphasizing the consensus among researchers regarding the invaluable impact of a robust R&D management framework. Even within the remaining 10.45% who maintain a neutral stance, the recognition of the system's potential benefits is implicit, hinting at the latent support for its implementation and the opportunities it could unlock for advancing research in Cambodia.

Figure 12: Important of National R&D Management system for researcher or research institutes in Cambodia



CHAPTER 4

R&D MANAGEMENT BLUEPRINT

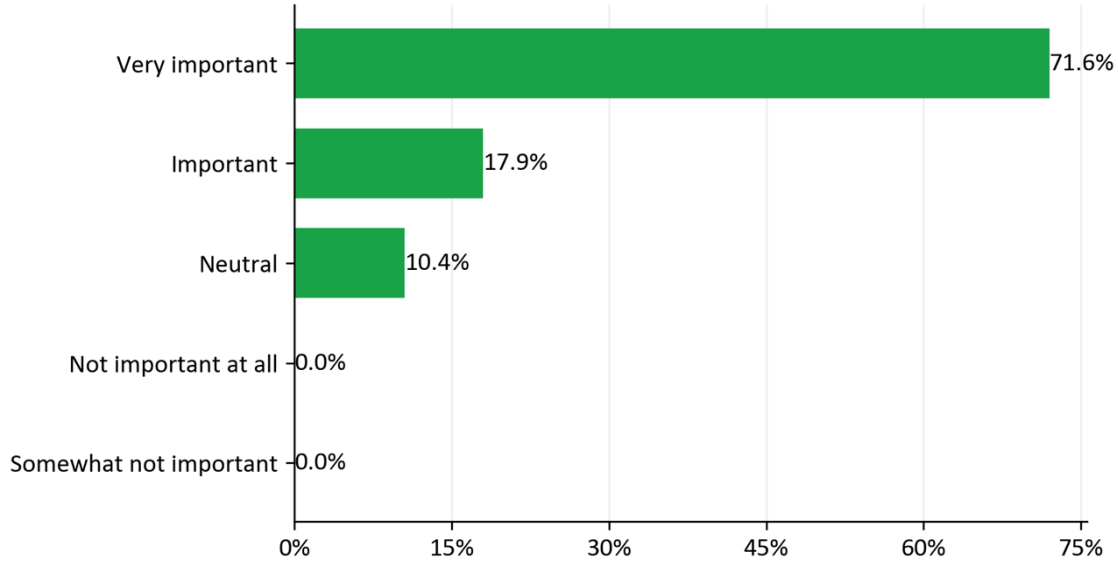


In this section, we delve into and explore the collective opinions of the researchers and scientific community in Cambodia regarding the functionalities and role of the Research and Development (R&D) Management System. This system is anticipated to provide a multitude of advantages to enhance research activities and establish a vibrant research ecosystem as the foundation of effective and creative research projects. It encompasses simplifying project planning and resource allocation, promoting seamless collaboration and communication among researchers. This blueprint has been developed based on the understanding of the demands of researchers and scientists in Cambodia, highlighting the elements and functionalities that they deem essential in such a system. It underscores its potential to revolutionize the way research is conducted, recorded, and disseminated. The objectives of the research community are reflected in this section, which encapsulates their vision of a future where technology will be instrumental in elevating the state of research.

4.1 Level of Importance

The respondents are asked about their perception on the level of importance of National R&D management System for researchers and research institutions in Cambodia. In Figure 13, the majority of researcher and scientist community, accounted for 70%, responds with the 'Very important' and about 20% believe that it is 'important' that the national management system should be in place. 10% stands neutral. None of respondents choose 'unimportant'. Overall, this graph would visually represent the strong consensus among the respondents that R&D is highly important, with a small percentage expressing a neutral stance and no respondents considering it unimportant or somewhat unimportant. The visual representation emphasizes the overwhelmingly positive sentiment regarding the significance of research and development.

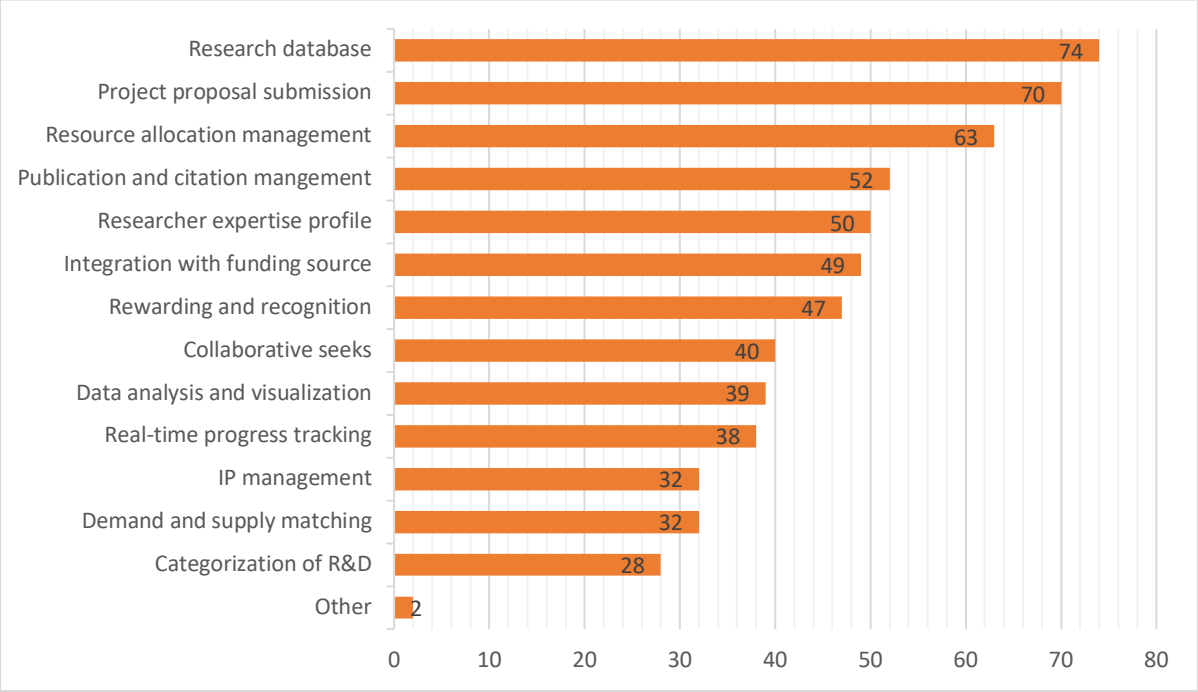
Figure 13: Level of importance of R&D management system



4.2 Feature of the system

To ensure that the R&D project management and system could support researchers and boost research activities in Cambodia, the survey gather and collects the insights and opinions from researchers and scientist community on the specific features that R&D management system could offer to them. There are a wide selection of features ranging from Research database to Intellectual Property management. According to the survey result, as shown in Figure 14, a collection of research database stands at the forefront of other features as it would provide convenient accessibility to the previous or existing studies and similar studies they can compare with. In addition, this feature can answer to their questions on the similar projects and the researchers in the fields. Project proposal submission stands at the second spot among other features. This feature is very important for government project management and very helpful and save a lot of time for the researchers to get information on available projects at different ministries in one glance. Resource allocation management is the third most picked by the researchers as it enables the project leader or managers to allocate the project resources effectively and efficiently. In addition to these top three features, publication and citation database, researcher expertise profile and integration with funding sources stays closely behind and have an average selection of about 50% each, which indicates the significant importance of these features in national system. In overall, the features that researchers select mostly enable them to access to information related to their research projects and allow them to manage the projects efficiently.

Figure 14: Features of R&D management system



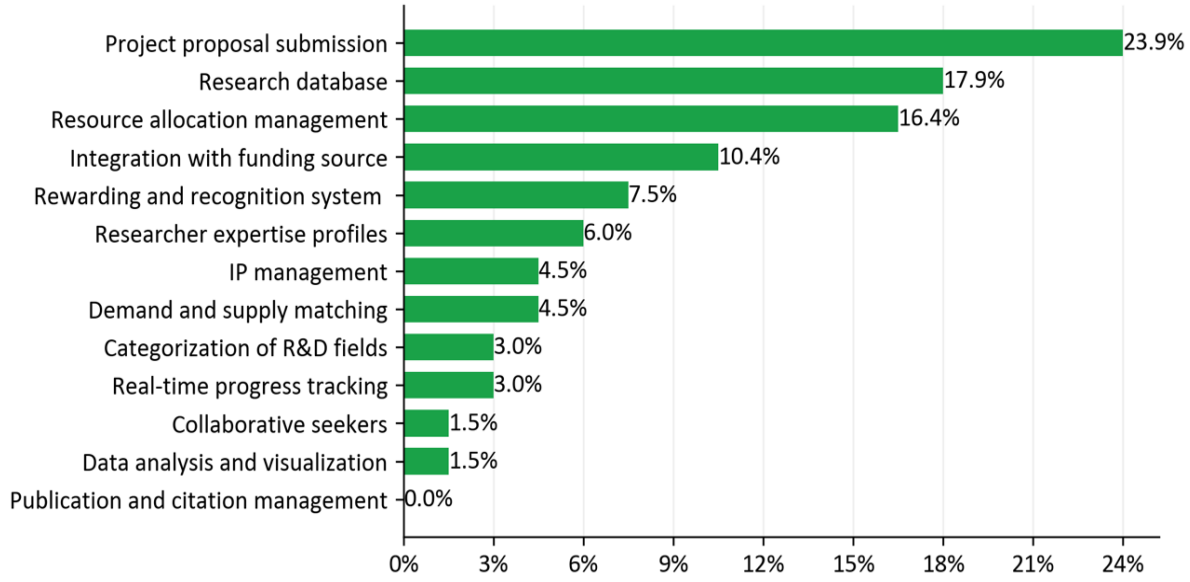
4.3 Ranking the level of feature

The respondents are then asked to rank their top 5 most required features for the system from 1 (most required) to 5 (less required) that serve their interests and benefits to their research activities. Below are the top 5 most selected features for the national R&D management system platform.

a. First feature

Based on the survey result, shown Figure 15, the feature that allows research proposal submission is the most picked as the top priority should be included in the system or the platform as shown in figure below, accounted about 25%. Resource allocation management and research database feature also stand at the favorable position as top priority as well.

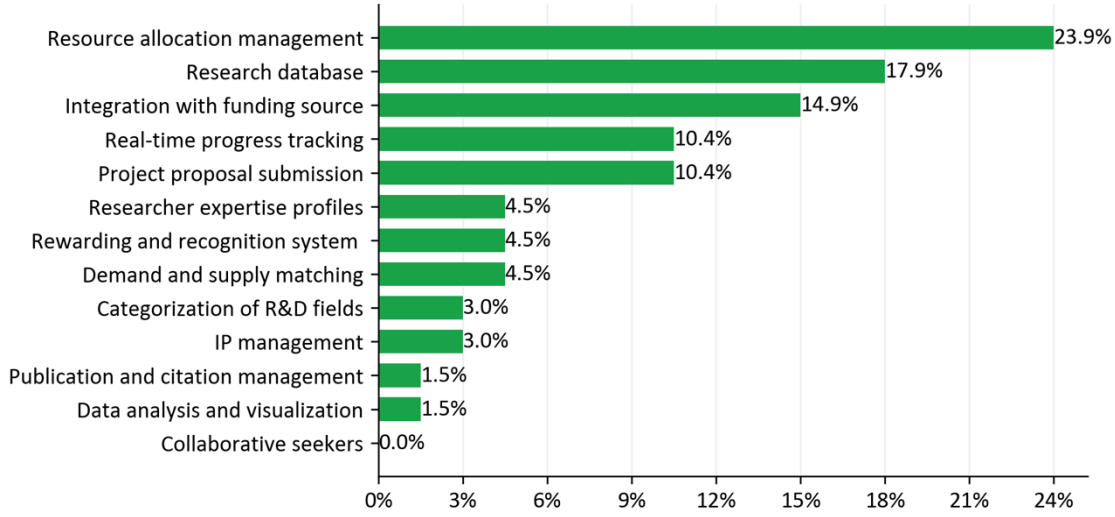
Figure 15: First feature of the system



b. Second feature

Figure 16 below shows the second top feature of the system or platform. The survey results suggested that resource allocation management feature is the most picked by the researchers and scientific community, take up to 25% of the overall fraction. The result is consistent with the previous figure. Meanwhile, research database and integration with funding source also stand at the sweet spots of the share.

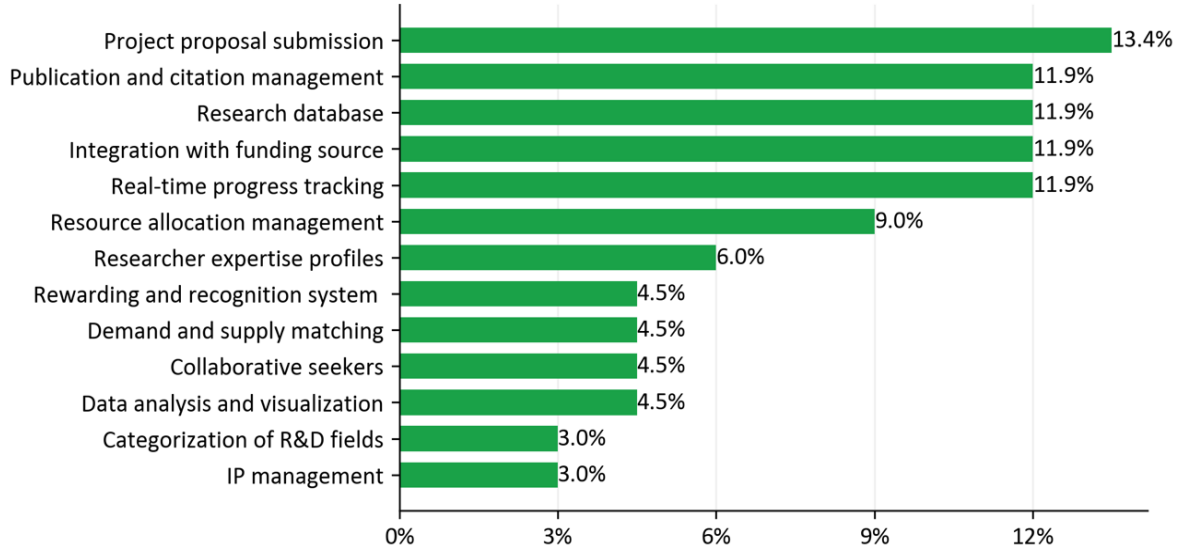
Figure 16: Second feature of the system



c. Third feature

The third feature, shown in figure 17 below, consists of several candidate including research database, real-time progress tracking, publication, citation database, and integration funding sources, all of which take account for more than 10% each among the researchers that vote for the third spot priority.

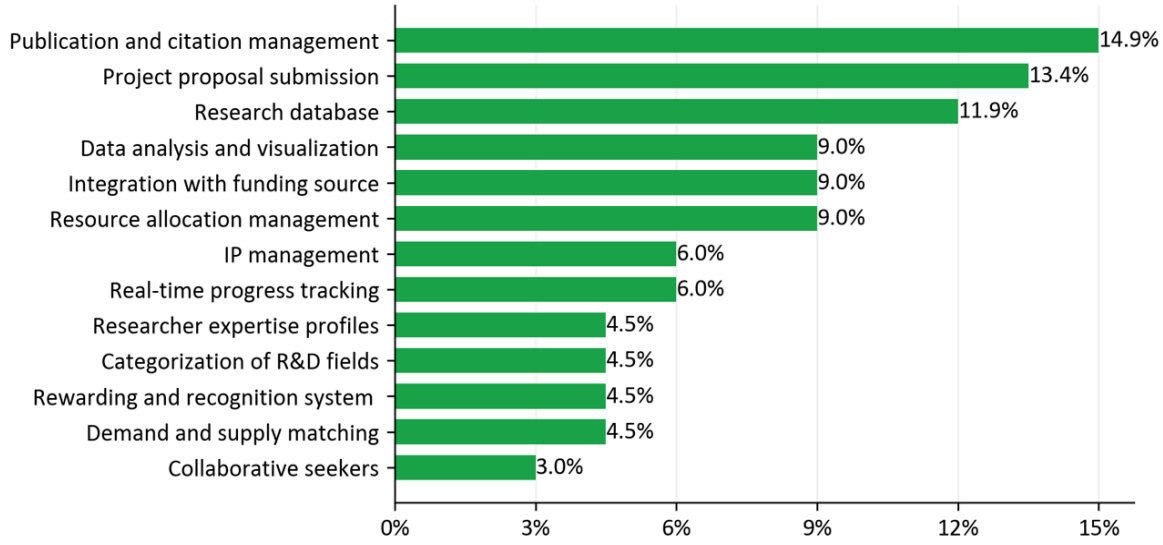
Figure 17: Third feature of the system



d. Fourth feature

The top fourth feature that should include in the management system or platform, based on the Figure 18 below, is publication and citation database, taking the top spot among other candidates, while project proposal submission, and research database can be alternatives.

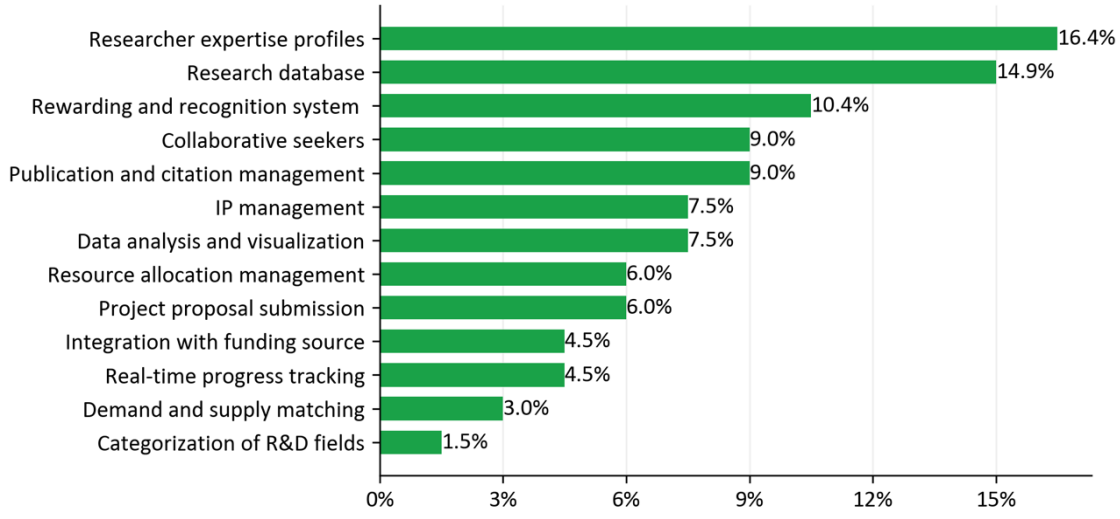
Figure 18: Fourth feature of the system



e. Fifth feature

Last but not least, Figure 19 below shows the fifth spot of the priority feature for the national R&D management system and platform. The survey result suggests that research database and researcher expertise profile are the most picked for the system, accounted for almost 20% each.

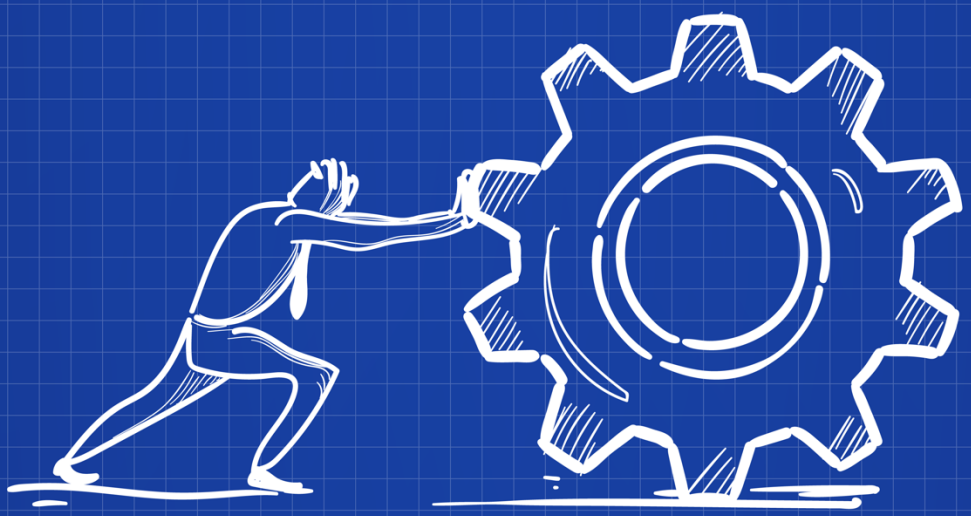
Figure 19: Fifth feature of the system



In sum, the most top 5 priority features based on the poll of the researchers and scientific community includes: project proposal submission, resource allocation management, research and researcher profile database, publication and citation database, and integrating with funding sources. This survey result also seems to be consistent with the result in question that the researchers and scientific community picks the favorite features in the previous question, and it also aligned with the inputs received from the roundtable discussions with the government, university, and private sector as well.

CHAPTER 5

OPERATIONAL PLAN

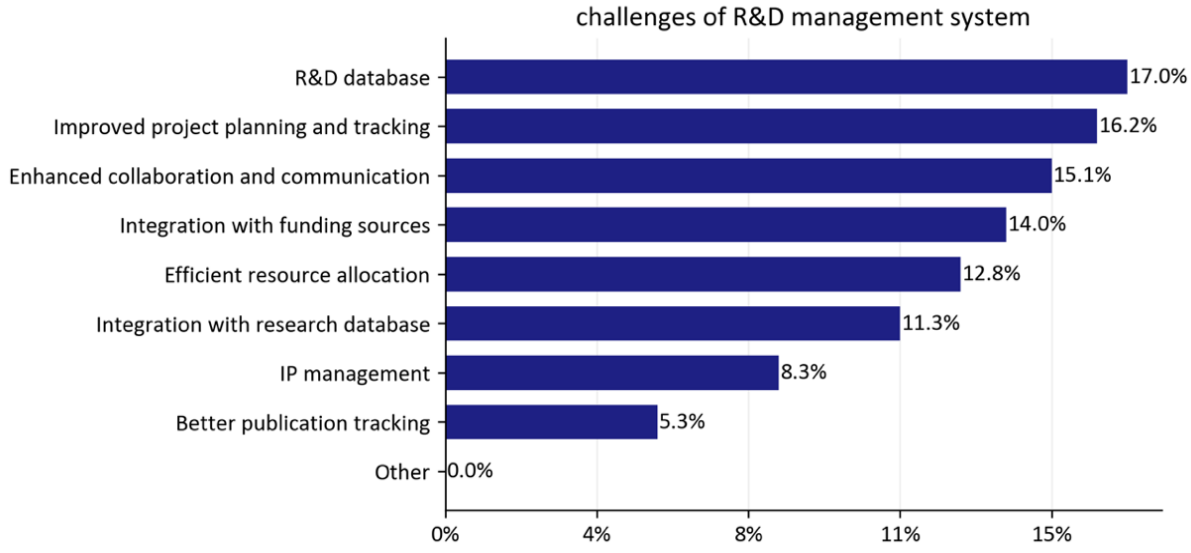


This section is to identify the potential of the R&D management system that could address the challenges the researchers has faced in terms of project planning and execution.

5.1 Challenges an R&D Management System Could Address

The survey result, in Figure 20, indicates that they could access to the research database available including the existing research study, the similar projects, the expertise in the fields, as well as for the literature review for their comparisons. Another major impact of the system and platform could be to improve the project planning and management. As indicated in the previous section, most planning has been done manually, or using some spreadsheet for project planning and management. As a result, if the system is in place, it could help the researcher to plan and manage the project effectively and efficiency. In addition, enhanced collaboration could be another potential this system could offer to the researchers as it provides accessibility to the researcher profile, expertise, publication history, and achievements. Integration with funding source and efficient resources allocation also provide great benefits to researchers and scientists from the system. In sum, researchers and scientists anticipate the positive contribution of the system for their research activities.

Figure 20: Challenges an R&D management system could address



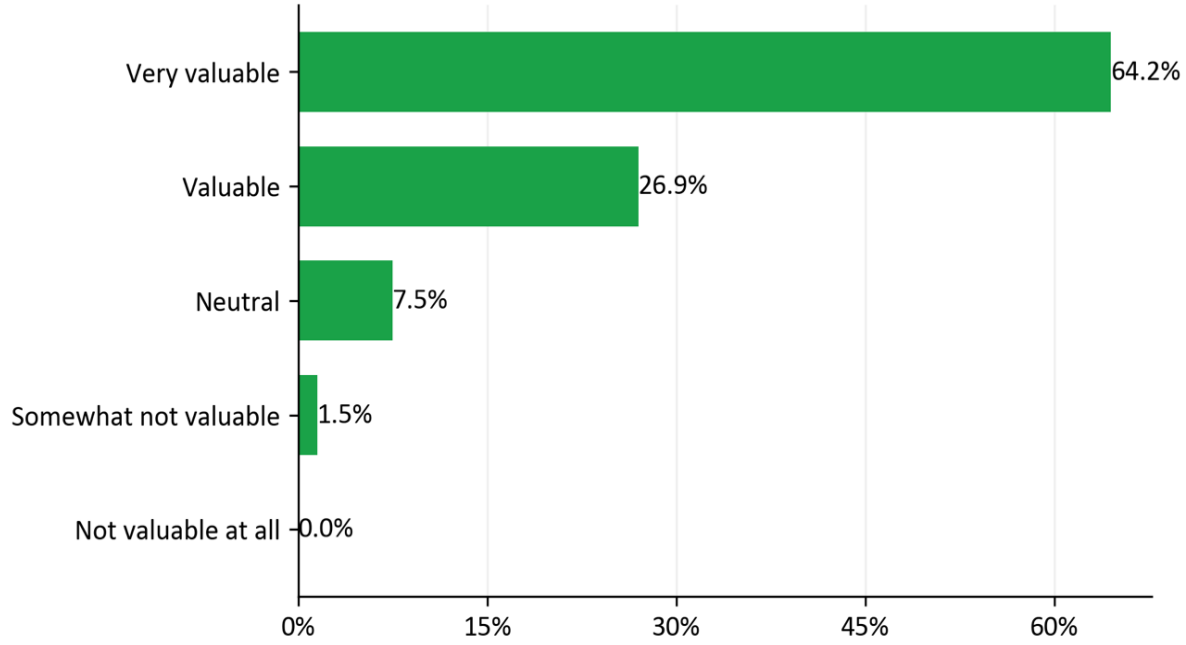
5.2 External Sources integration

This section delves deep into the necessities of the integration with external sources and the benefits that might come with it.

a. Funding source integration

The survey investigates whether the integration with external funding sources and grant management systems be valuable for the research activity or not. The survey result suggests that, illustrated in figure 21 below, funding source integration is very beneficial to them, more than 60% vote for very valuable and 30% for valuable. Only less than 10% vote for neutral and around 1% perceive that this functionality is somewhat not valuable. As indicated in the previous session, most researchers somehow have a hard time in securing research funding.

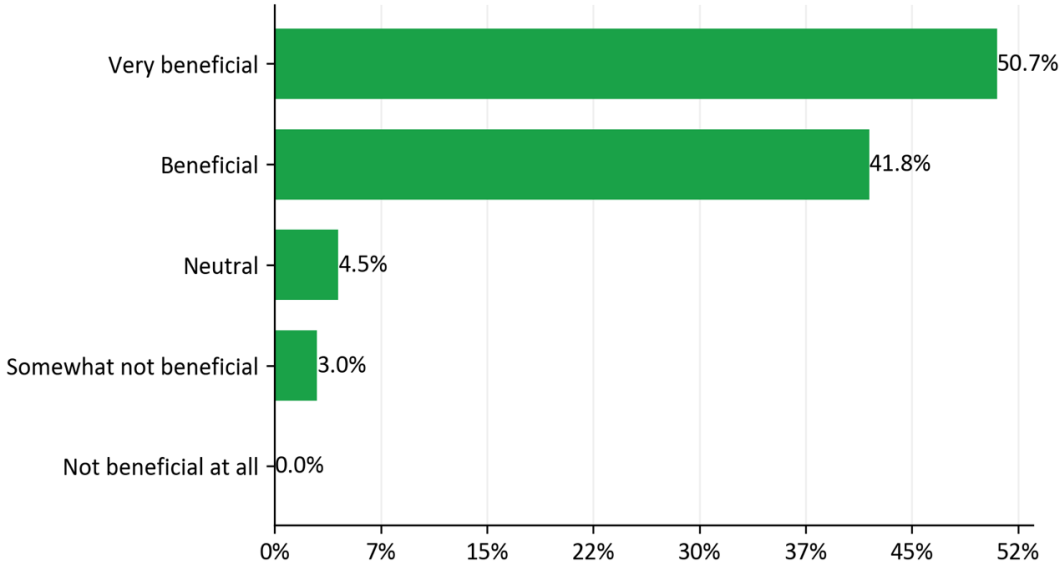
Figure 21: Integrate with external funding sources and grant management system feature



b. External citation database

Similar to funding source, the integration with external citation database is also welcomed by many researchers and scientists as well. The survey result, in Figure 22, illustrates that more than 50% and 40% suggest that integration with citation and databases and publication tracking tools is very beneficial and beneficial for their research, respectively; while only the small fraction thinks otherwise.

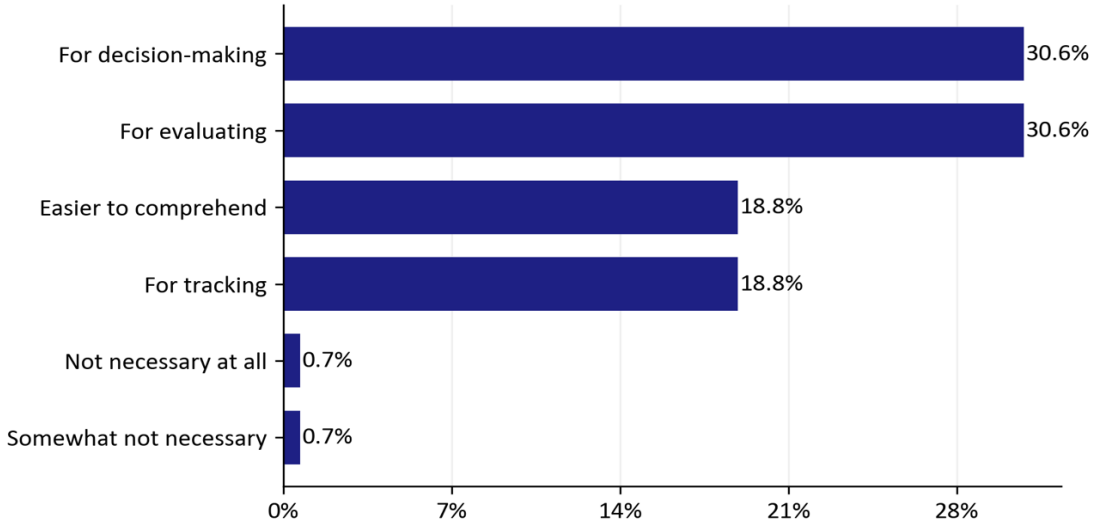
Figure 22: Integration with citation database and publication tracking feature



5.3 Data visualization

Data visualization and analytic capabilities have also been investigated for their importance for the R&D management system platform. The result indicates that most researchers and scientist community strongly agree on the importance of this functionality for their research activities. Shown in Figure 23, more than 60% of the respondents suggest that this functionality would be very crucial for evaluating the research performance while similarly this functionality could be indispensable for decision making tool as well for research, business and policy making alike. Some suggests that this feature could be provide easier comprehension of data analytics and easier for tracking. Only less than 5% in total believes that this function is somewhat not necessary and not necessary at all.

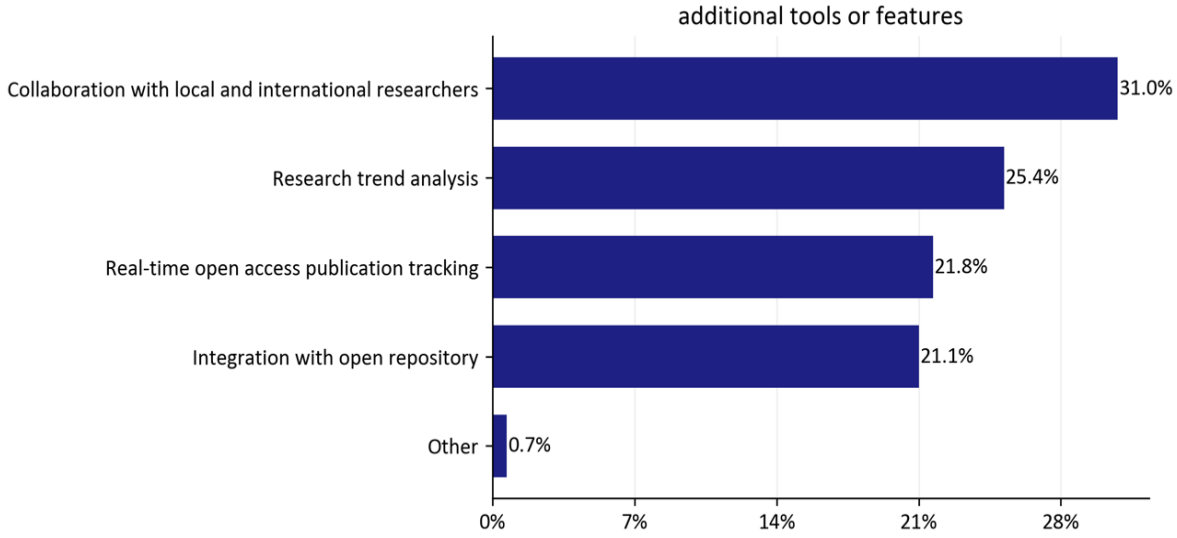
Figure 23: Data visualization and analytic capabilities



5.4 Features support open science

The researchers were also asked to identify any other additional tools or features that the system could support their research activities as well as open science initiatives. The result, illustrated in Figure 24, suggests that collaboration with local and international researchers is the most desired one, voted by almost 70%, while the capabilities of research trend analysis, real-time open publication tracking, and integration with open repository are all the plus for our research management system platform, accounted for 53, 46 and 45% respectively.

Figure 24: Additional features support open science initiatives



5.5 Collaboration seekers

Another feature that investigated in the survey is the collaboration seekers capability of the system. The collaborative research is mentioned in the National Research Agenda 2025 to be promoted in order to enhance innovation. The result, as shown in the Figure 25, indicates that more than 90% of researchers in the survey positively believe that R&D management system could assist with the identification of potential research partners or collaborators across different fields. The respondents are then asked to specify how the system could assist the identification. The respondents suggest, in Figure 26, that through the wide range of data of research profiles as well as through the integration with researcher platform such as LinkedIn and Researchgate as well as through researcher publication history, as shown in figure below.

Figure 25: R&D management system assist the identification of potential partners and collaborators

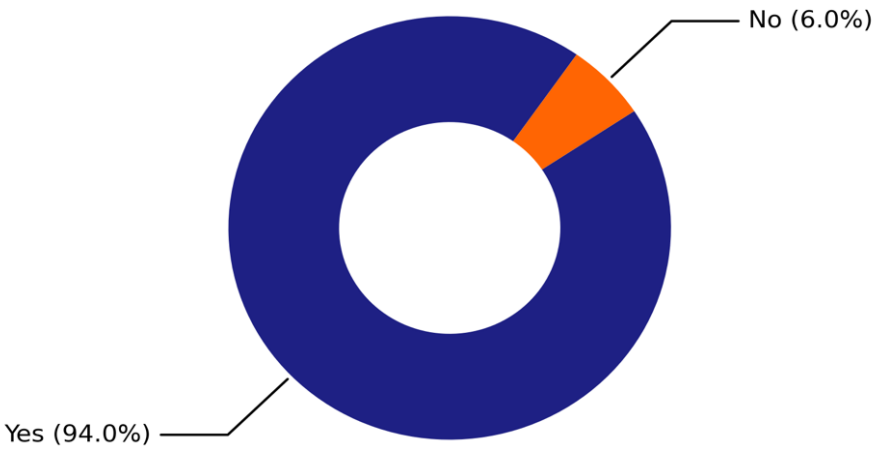
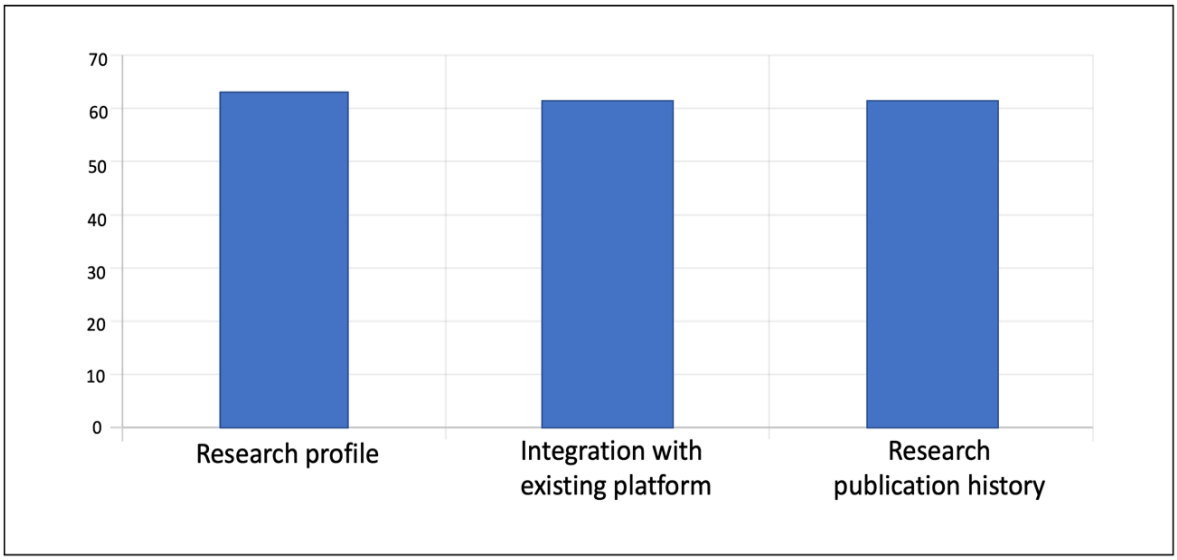
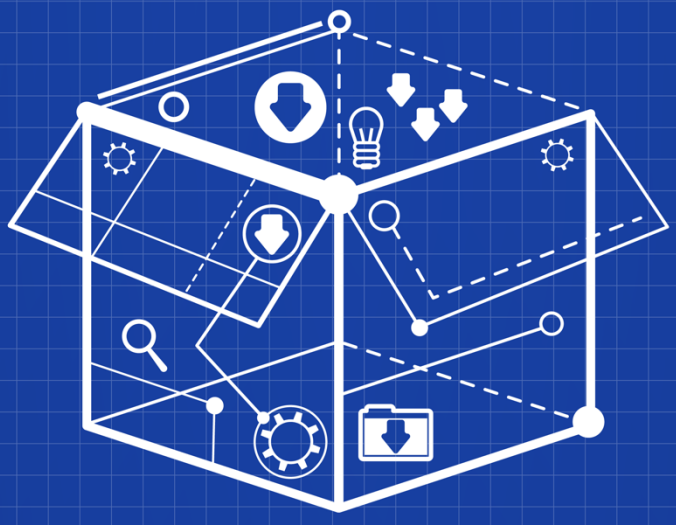


Figure 26: Collaborator seeker methods



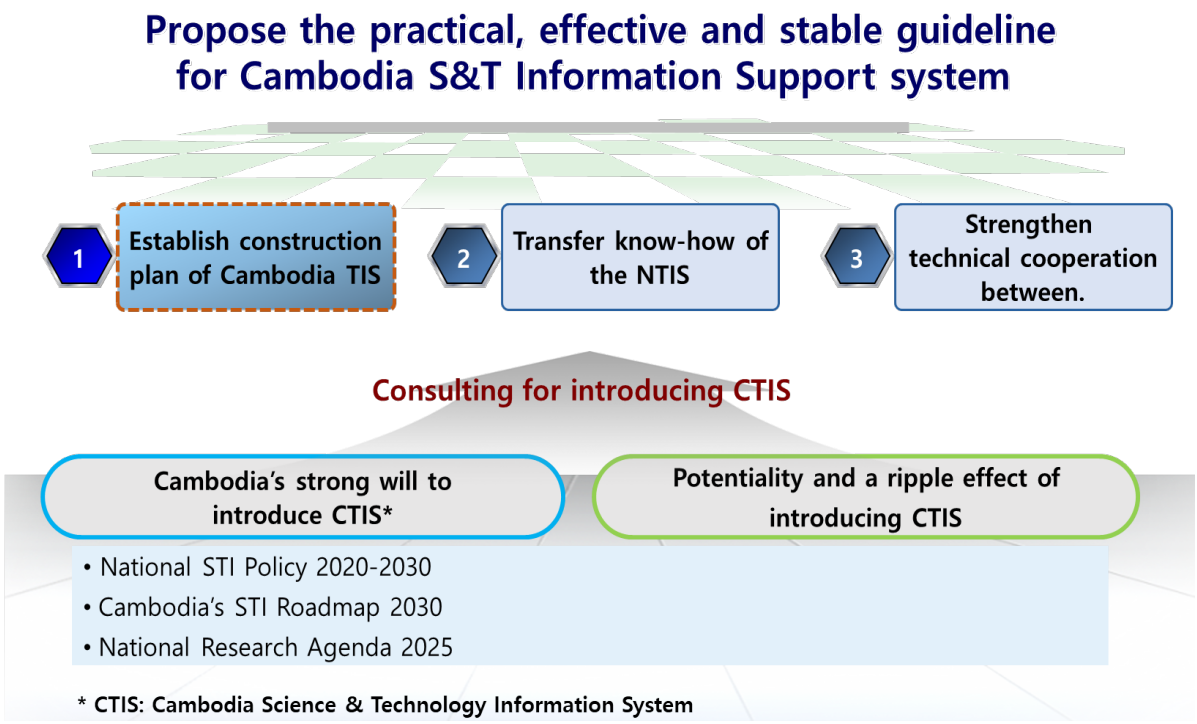
CHAPTER 6

TECHNICAL FEASIBILITY



The chapter explores the technical feasibility of the desired R&D management system for Cambodia, outlining the requirements necessary for the system to be in place. Recognizing the critical role of R&D in driving innovation and promoting her competitiveness in the region and globe for the economic and sustainable development, as clearly indicated in the national policies including Cambodia's Science, Technology and Innovation Roadmap 2030 and National Research Agenda 2025, it is important to develop a comprehensive R&D management system to can increase the effectiveness and efficiency. In addition, Cambodia has shown its steadfast in the commitment in capacity building through efficient and effective national R&D and technology transfer initiatives. With the technical support from Korean Institute of Science and Technology Information (KISTI) as it has the expertise and experiences in building a national R&D information management system and Natonal Science & Technology Information Service (NTIS) for the Republic of Korea, MISTI has outlined and established a target system and action plan to build a Cambodian R&D Information Management System/Platform (CTIS), shown in Figure 27, that is in line with all relevant Cambodia's policies and utilizes the accumulated information.

Figure 27: Background and purpose



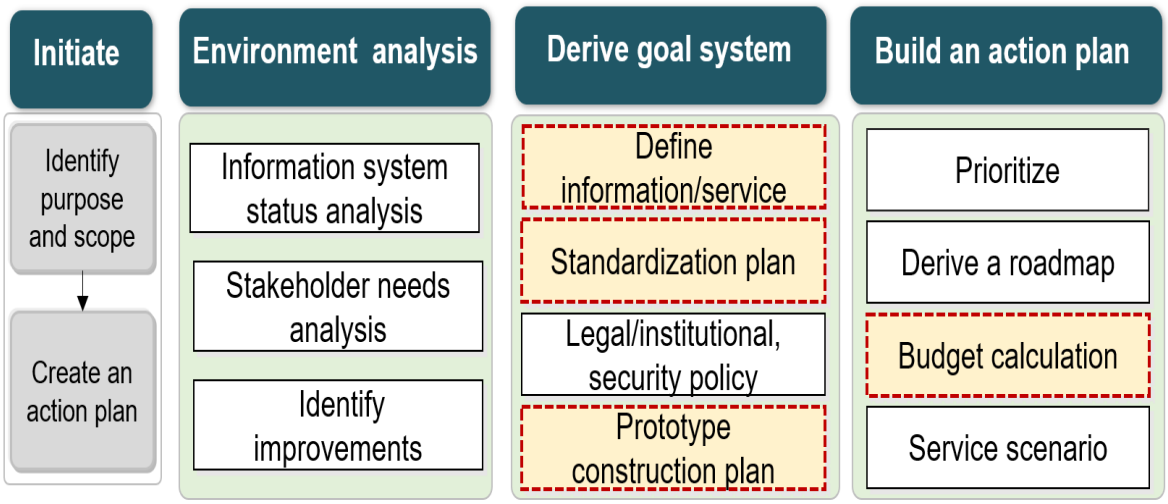
Source: Author's elaboration based on KISTI NTIS Center.

6.1 Scope of R&D Management System of Cambodia

This report covers the typical pre-feasibility study process of defining information and services, planning to build a prototype, and calculating a budget. The summary scheme of the scope of the management system is shown in Figure 28. The important steps outlined below are crucial for the current study on the development of the R&D management system.

- **Define Information/Service:** Define main services and information according to the current state of Cambodia's National R&D Information Management System.
- **Standardization Plan:** Establishment of National R&D information standard items for joint use and management of R&D information.
- **Prototype Construction Plan:** Derive a target system suitable for Cambodia and establish a plan for implementation.
- **Budget Calculation:** Estimate the cost to build the planned target system.

Figure 28: Scope of R&D Management System of Cambodia



Source: Author's elaboration.

6.2 Promotion Strategy

As an implementation strategy for the development of a national R&D information management prototype in Cambodia, we analyze the results of interviews with relevant organizations in Cambodia in 2023, establish a construction plan based on the needs of multi-stakeholders, derive target system deliverables, and calculate construction cost as shown in Table 2. The entire process in the entire process is being carried out in cooperation with KISTI, Korea based on its expertise and experience in developing and managing Korean's National

Science and Technology Information Management System, which effectively contributes to Korea's innovation capabilities.

[Table 2] Strategy by action plan

Plan	**Method**
Cambodia R&D Information Management System Research/Analysis	• Research and analysis of R&D information management status in Cambodia through relevant organizations (Survey on National R&D Management System for Cambodia, 2023) • National needs
Derivation of Target system	• Derivation of key tasks and goal system for Cambodia's R&D information management system, reflecting Cambodian national R&D information management system status analysis results, national needs, and MISTI opinions
Derivation of Construction Plan	• Derivation of roadmap and construction cost based on Cambodia's R&D information management target system

Source: Author's elaboration.

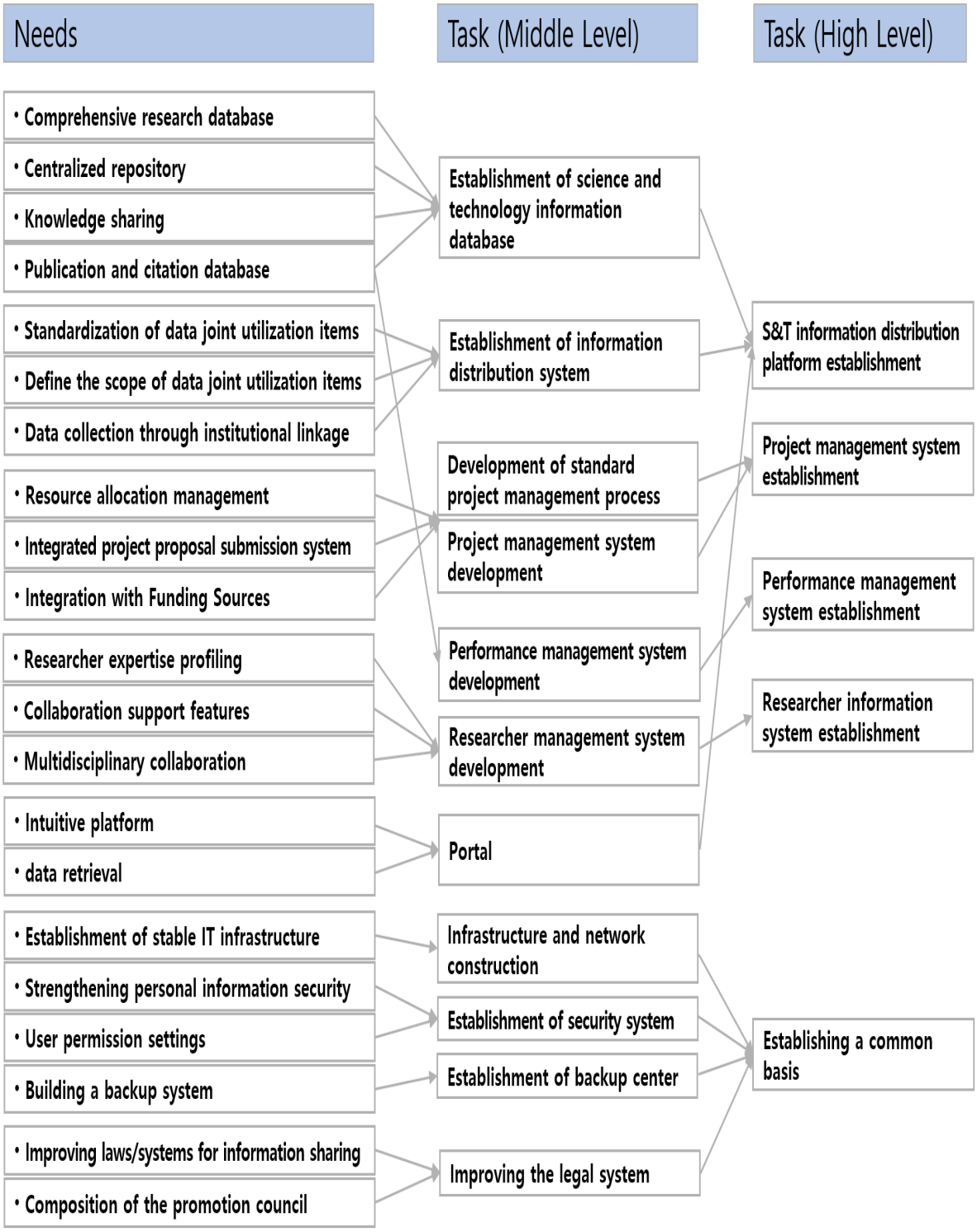
6.3 Cambodia R&D Information Management System Research/Analysis

Based on the results of the Cambodian National R&D Information Management Status Survey interviews and scientist community demands, we collected and analyzed the pressing needs of the system tailoring to Cambodia's context, and categorized them into information systems, laws/institutions, and standardization, and derived five key functionalities based on their characteristics and similarities.

The main demands were for an integrated research database, standardization of jointly used information, project management (proposal, execution, evaluation, etc.), researcher information, data search/portal, stable infrastructure, security, backup system, and legal/institutional improvements. Based on this, we derived mid-level tasks such as Establishment of science and technology information database, Establishment of information distribution system, Development of standard project management process, Project management system development, Performance management system development, Researcher management system development, Portal Establishment, Infrastructure and network construction, Establishment of security system and backup center, Improving the legal system.

We grouped the middle tasks into similar ones and finally came up with five action tasks: Science technology information distribution platform establishment, Project management system establishment, Performance management system establishment, Researcher information system establishment, and Establishing a common basis.

Figure 29:R&D Information Management System Needs Analysis in Cambodia

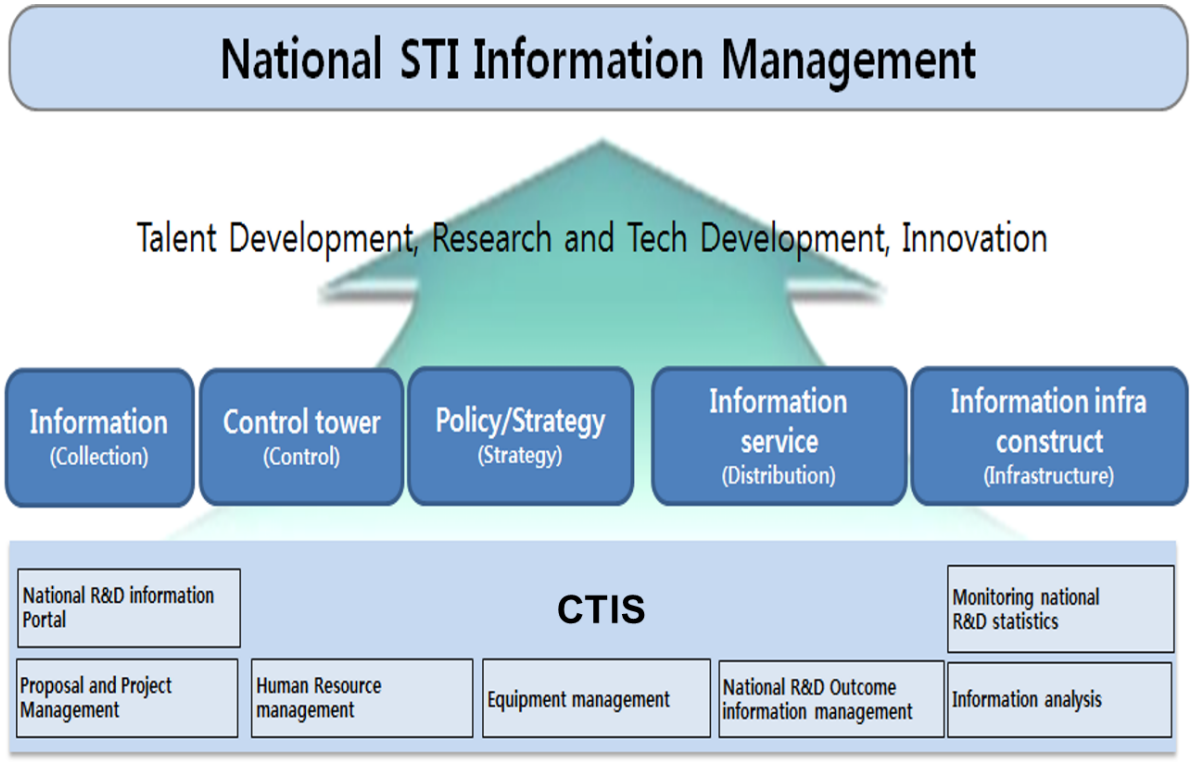


Source: Author's elaboration.

6.4 Vision and Target system

The vision is to build a national R&D project management system (proposal, execution, evaluation, etc.), researcher information management system, equipment management system, etc. as prototypes, and to manage national S&T information through information collection, policy formulation, and information service provision based on Cambodia's integrated national R&D information system.

Figure 30:Cambodia National R&D Information System Vision

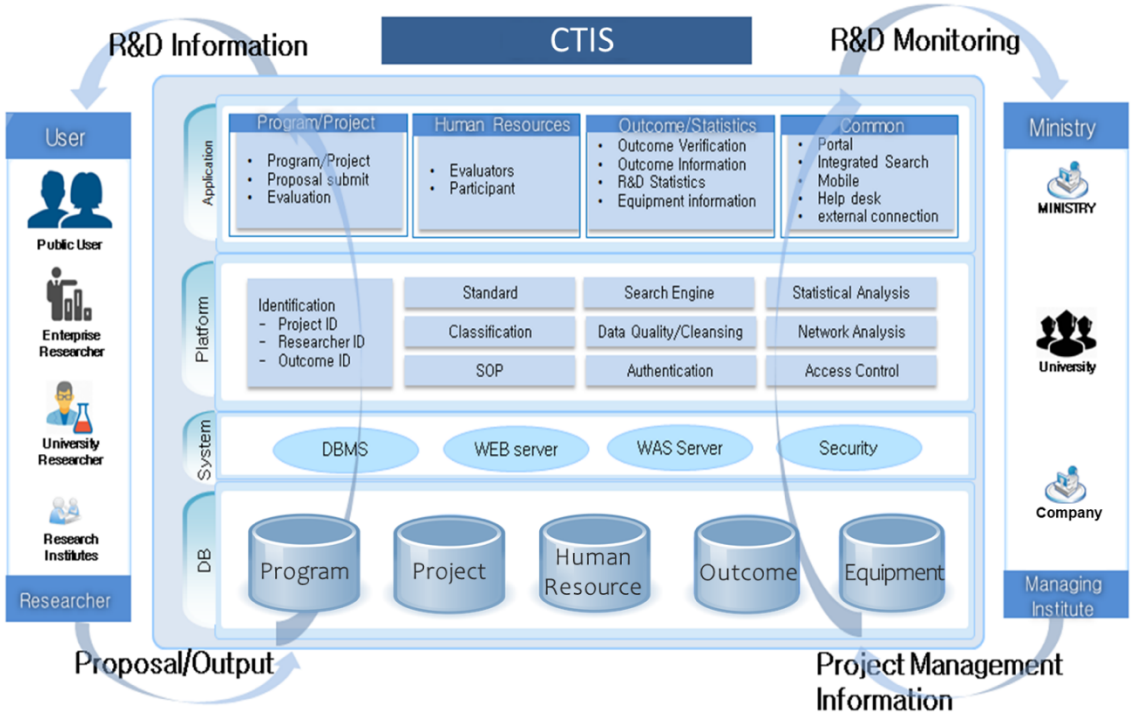


Source: Author's elaboration based on Development on Platform Model for National R&D Information, KISTI Report (2016).

6.5 Services

The figure below is a conceptual view of the Cambodian National R&D Information Integration System. The Cambodia National R&D Information Common Platform will be able to collect, link, and service information on projects, tasks, researchers, outcomes, etc. from organizations conducting national R&D projects. The system will provide an integrated database, information system, platform, and information services from the perspective of ministries, agencies, and researchers in Cambodia's national R&D management. After building a prototype, you'll need to expand your collection/linkage organizations, data items, and services offered.

Figure 31:Target System Concepts



Source: Author's elaboration based on Development on Platform Model for National R&D Information, KISTI Report (2016).

• **CTIS Portal:** A unified portal to provide integrated search services for national R&D information, including programs, projects, researchers, achievements, and research facilities/equipment.

• **National R&D project management:** Provides current information on national R&D programs and projects, including project summary information (classification, keywords, etc.), participating researchers, induced outcomes, and effective evaluation.

• **Researcher Information management:** Provides information on the history (Education/Career, Project, Paper, Patent, Books, Major Activities, Awards) of researchers who participated in National R&D projects

• **R&D Outcome Information management:** Provides outcome information such as papers and patents generated by National R&D project.

• **Facilities and equipment information management:** Provides Research Facility & Equipment Search function, Research Facility & Equipment Information, Research Facility & Equipment Reservation service.

• **National R&D announcement:** provides national R&D announcements from more than 120 ministries and project management institutes. And user can Register the ministries or keywords of users' interest and conveniently receive public announcements by email.

• **Statistical information service:** provides domestic and foreign science and technology statistical information such as major science and technology statistics, technology capability evaluation, science and technology prediction, and various science and technology indicators related to research facilities and equipment.

6.6 Information

Basic items proposed for national R&D information collection/linkage for Cambodia's National R&D Information Management Prototype System is presented in Table 3. These can be changed, deleted, or added based on the Cambodia's environment. For example, as shown in item 9 of the project basic information, 'Continuous Project Y/N' means whether the project is classified/secure or not. If the concept of a security assignment does not exist, you can confirm by deleting the item.

[Table 3] Information items

Category	Information Item	Number	Name
Project Information	Program	1	Program Name
		2	Name of Ministry
		3	Program Period
		4	Program Budget
		5	Funding Budget
		6	Enforcement Amount
		7	Budget Amount of Agreement
		8	Program purpose classification code
	Basic Information	9	Continuous Project Y/N
		10	Project ID
		11	Project Title
		12	Total project period
		13	Research Subject Code
		14	Region
		15	Standard Classification Code
		16	6T Technology related Code
		17	Summary of Research Objectives
		18	Summary of Research
		19	Expected Effect Summary
		20	Khmer Keyword
		21	English Keyword
		22	Confidential Project Y/N
		23	Confidential Project End Date
		24	Period of the Project
		25	Project Management Organization Name
		26	Name of Organization
		27	R&D Phase Code
		28	Project Progress Status
		29	Government Investment Research Budget

		30	Data of Signing
	Final Evaluation Result	31	Project Identification Number
		32	Aborting the Project Y/N
		33	Type of the Abortion
		34	Reason for the Abortion
		35	Abortion Data
		36	Final Evaluation Result_Evaluation Data
		37	Final Evaluation Result_Rating
		38	Final Evaluation Result_Score
		39	Final Evaluation Result_Evaluation Category
	Evaluator	40	Project Identification Number
		41	Date of Participation Number
		42	Science and Technology Registration Number
		43	Name of the Evaluator
		44	Evaluation Step
	Project Budget	45	Personnel Expenses(Salary)
		46	Direct Expenses
		47	Overhead
		48	Budget for Commissioned Research Project
		49	Matching Fund
	Commissioned Projects / Joint Research	50	Co-operative Research Y/N
		51	Commissioned/Co-operative Research Project Number
		52	Commission Project Name
		53	Name of Performing Organization
		54	Commissioned Project_Total Research Period
		55	Commissioned Project_Total Research Budget
	Participation Researcher	56	Role Code
		57	Researcher Number
		58	Participation Period
		59	Participation Rate
		60	Participation Researcher Gender
		61	Participation Researcher Major
		62	Participation Researcher Degree
		63	Number of Participating Researchers
	Project Announcement	64	Name of Ministry
		65	Name of the announcing Agency
		66	Notice Title
		67	Date of Announcement
		68	Application Deadline
		69	Announcement Contents
		70	Application URL
Outcome Information	Publication	71	Journal Title
		72	Publication Title
		73	ISSN_ISBN

		74	Major Author Name
		75	Journal Volume Number
		76	SCI Code
		77	Co-author Names
		78	Domestic or Foreign
		79	Abstract
		80	Conference Hosting Country Code
		81	Conference Paper Title
		82	Date of Publication
		83	Start Page Number
		84	End Page Number
		85	DOI
	Intellectual Property	86	Application or Resister
		87	Title of the Patent
		88	Application Country Code
		89	Application Number
		90	Registration Number
		91	Date of Application
		92	Applicant Researcher Number
	Research Report (Result)	93	Report Title
		94	Issuing Organization Name
		95	Issuing Country Code
		96	Issue Date
		97	Used Language
		98	Whether the source is disclosed
		99	Abstract
		100	Keywords
		101	Management Organization Name
Researcher Information	Career	102	Place of Work(Career)
		103	Title
		104	Employment Period
	Basic Information	105	Name of Participant
		106	Institution Classification
		107	Mobile Phone Number
		108	Specialty
		109	E-Mail
		110	Researcher Number
	Publication	111	Publication Date
		112	Khmer Title
		113	English Title
		114	Journal Name
		115	ISSN_ISBN
		116	Major Author Name
		117	Journal Volume Number
		118	SCI Code
		119	Co-author Names
		120	Domestic or Foreign

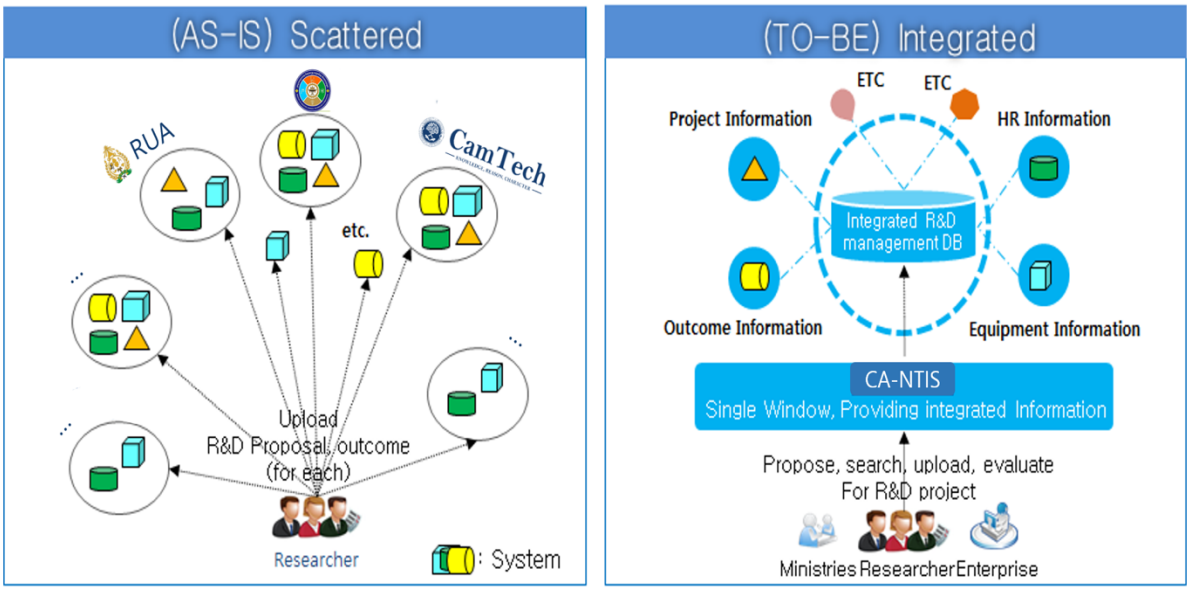
		121	Abstract
		122	Conference Hosting Country Code
		123	Conference Paper Title
		124	Date of Publication
		125	Start Page Number
		126	End Page Number
		127	DOI
	Work Experience	128	Address of the Organization
		129	Office Phone Number
		130	Department
		131	Institution Name
		132	Title
		133	First Appointment Date
	Education Qualification	134	Dissertation Title
		135	Degree Date
		136	Major
		137	Acquisition University
		138	Degree
		139	Admission Date
		140	Year of Graduation
		141	Department
		142	Country Code
		143	Name of the Advisor
Evaluation committee	Basic Information	144	Expert Classification of each Ministry
	Committee	145	Responsibility
		146	Position
		147	Name of the Committee
	Book Writing (Translation)	148	Translator name
		149	Publication year
		150	Publisher
		151	Writing or Translation
	Award	152	Date of Award
		153	Name of Granting Organization
		154	Name of Award

Source: Author's elaboration.

6.7 Information Linking Institutes

In the environment where Cambodia is conducting national R&D projects or operating information systems for each individual institution, it should be built in the direction of overall integration for work efficiency and integrated DB utilization.

Figure 32:Integrated national science and technology database



Source: Author's elaboration based on Development on Platform Model for National R&D Information, KISTI Report (2016).

It is necessary to identify the number of major institutions related to the Cambodian national R&D project and the number of key information such as tasks and performance of the institutions determined to be targeted for the prototype linkage, as well as the DB structure for integration, as shown in Table 4.

[Table 4] Data holdings by organization

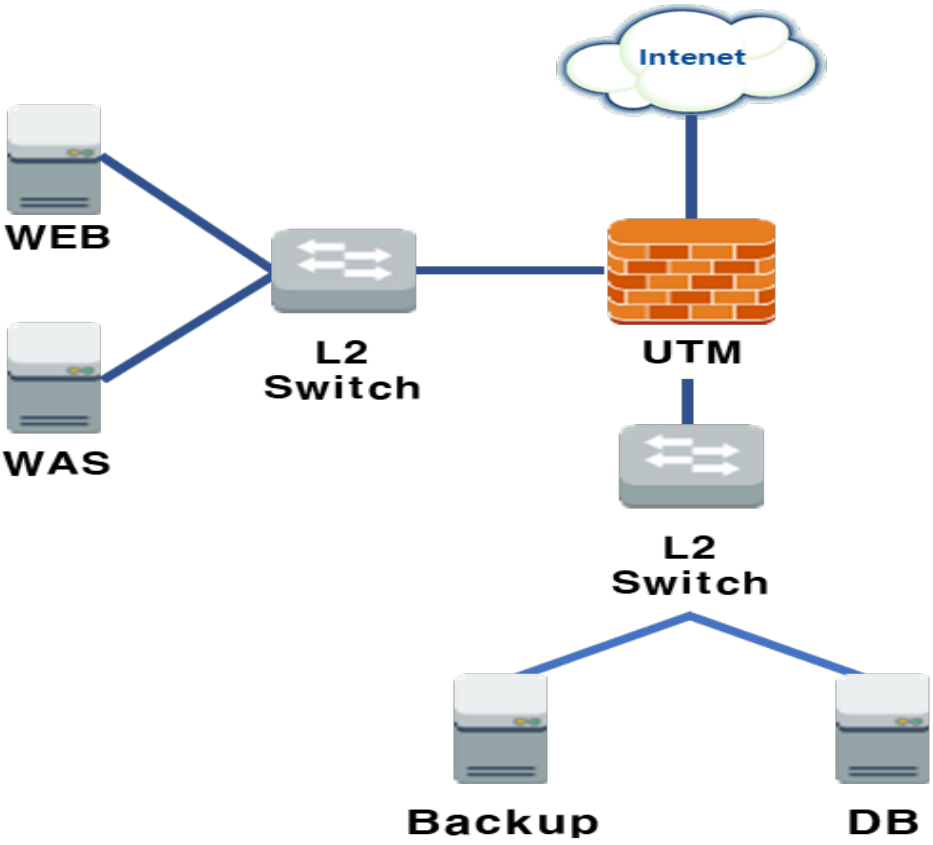
Information	Project	Researcher	Paper	Patent	Total
Institute of Technology of Cambodia	-	-	-	-	-
Royal University of Phnom Penh	-	-	-	-	-
Royal University of Agriculture	-	-	-	-	-
University of Health Science	-	-	-	-	-
Ministry of Education	-	-	-	-	-
Ministry of Civil Service					
Ministry of Labor					
Ministry of Foreign Affairs and International Cooperation					
Ministry of Commerce					
Ministry of Industry and STI					

Source: Author's elaboration.

6.8 Infrastructure

Currently, Cambodia has a well-established infrastructure environment for building and operating a prototype-level or basic information system (shown in Table 5), so it is possible to organize the following specifications within the already established infrastructure environment rather than introducing or purchasing new equipments.

Figure 33:Infrastructure concept diagram



[Table 5] Infrastructure specifications and availability

Name	Specification	Availability
UTM	10/100/1000 Base-T 8Port	All next-generation firewall features are already existing in the infrastructure 1Gbps speed is not available, all connections are using fiber optic, minimum speed is 10Gbps
	1000Base-X 4Port	
	Firewall [Essential]	
	IPS [Selection]	
	SSLVPN [Selection]	
DMZ L2 Switch	10/100/1000 Base-T 24Port	L2 Switches are not available. L3 Core Switches, Access Switches are used in the infrastructure with uplink speed of 100Gbps, 40Gbps, 25Gbps and 10Gbps
	1000Base-X 4Port	
INT L2 Switch	10/100/1000 Base-T 24Port	
	1000Base-X 4Port	
WEB/WAS Server	CPU : Intel Xeon-Gold 3.6GHz 16core	Allocable
	Memory : 64GB	
	Disk : 1.92TB SSD * 2EA	
	OS: Free [CentOS, Rocky Linux etc.]	
	Apache, Tomcat	
DB Server	CPU : Intel Xeon-Gold 3.6GHz 16core	Allocable
	Memory : 64GB	
	Disk : 1.92TB SSD * 2EA	
	OS : Free[CentOS, Rocky Linux etc.]	
	DB : Free[mongo, Maria, Postgre etc.]	
Backup	CPU :Intel Xeon-Silver 2.8GHz 16core	Allocable
	Memory : 64GB	
	Disk : 960TB SSD * 2EA 4TB NLSAS * 4EA	
	OS: Free [CentOS, Rocky Linux etc.]	
	Backup S/W inclusion	

Source: Author's elaboration.

6.9 Budget

To calculate the budget for the prototype of the Cambodian National R&D Integrated Information System, we used the same methodology as the budget for the system in Korea as indicated in Table 6. The budget was calculated based on the software cost calculation guide published by the Korea Software Industry Association in 2024. In detail, we calculated the required investment for each major service by reflecting the labor and expenses of developers, consultants, and designers published in the software cost calculation guide. As the actual system will be built by a Korean system development company that received KISTI's technology, the budget is calculated using the wages of Korean SW worker. The M/M used in budgeting represents the amount/scope of work that one person should do in a month. In other words, it is meant to express how many technicians are needed to develop a piece of software. It is a concept used to understand the scope and cost of development.

[Table 6] Estimated costs for major groups

Group	Budget	Priority
Consulting (2 months)	$22,000	1
Information system construction/operating (H/W, network, etc.)	-	1
Design, Publishing	$14,500	1
National R&D information portal development (prototype)	$7,850	1
Project management	$47,100	
· Initial DB construction · National R&D access control	($) 15,700	1
· Program/Project/Proposal/Evaluation	($) 31,400	
Outcome management	$47,100	
· Initial DB construction · National R&D access control	($) 15,700	1
· Paper, Patent, Final report	($) 31,400	
Researcher management	$47,100	
· Initial DB construction · National R&D access control	($) 15,700	1
· Education/Career, Participation projects, etc.	($) 31,400	
Tax, Staying expenses (Withholding tax, Business trip expenses, etc.)	$65,000	1
Subtotal (Priority 1)	$250,650	
Announcement management (Registration, inquiry, change, deletion)	$15,700	2
Facility/Equipment Management	$47,100	
· Registration, inquiry, change, deletion, location	($31,400)	2

・ Reservation	($15,700)	
Statistics information	$47,100	2
・ R&D expenditures, number of projects (by year, by classification, etc.)	($11,775)	
・ Research and development researcher (by region, by classification, by major, etc.)	($11,775)	
・ Outcome (Papers, Patents, Facilities/Equipment)	($11,775)	
・ OECD Statistics	($11,775)	
Total (Priority 1,2)	**$360,550**	

Source: Author's elaboration.

• Expected Cost (Priority 1): $ 250,650

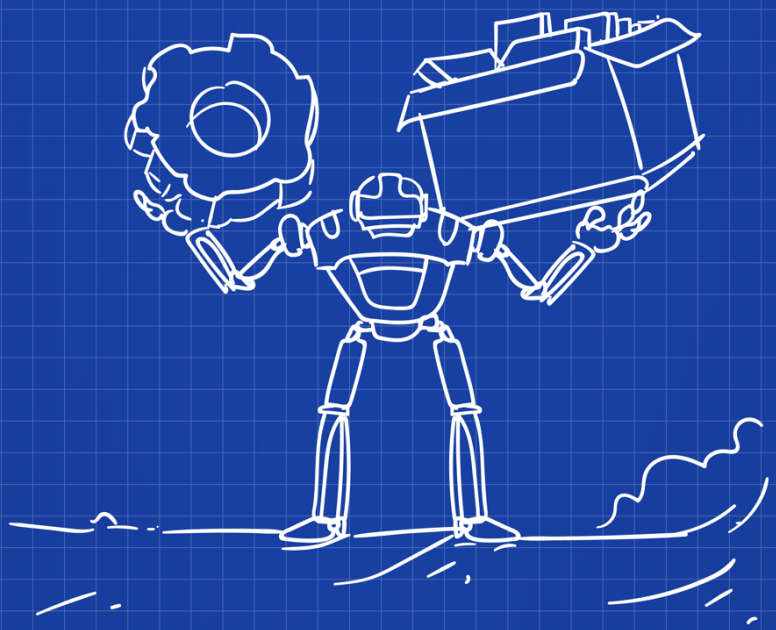
- Consultant: 2M/M * $11,000 (Including financial and technical costs) = $22,000
- System Software Developer: 19 M/M * $7,850 (Including financial and technical costs) = $149,150
- Designer: 3M/M * $7,250 = $14,500
- Withholding tax, Business trip expenses = $65,000

• Expected Cost (Priority 1, 2): $360,550

- Consultant: 2M/M * $11,000 (Including financial and technical costs) = $22,000
- System Software Developer: 33 M/M * $7,850 (Including financial and technical costs) = $259,050
- Designer: 3M/M * $7,250 = $14,500
- Withholding tax, Business trip expenses = $65,000

CHAPTER 7

IMPACTS AND RISKS



7.1 Concerns and Barriers

The implementation of a national Research and Development (R&D) management system can encounter a range of concerns or obstacles, as revealed by the insights of researchers in the field including technical challenges, data privacy and security concerns, lack of training, integration challenges, and resistance to change, clearly illustrated in Figure 34 below.

Technical Challenges: Implementing a robust R&D management system often involves using sophisticated software, data analytics tools, and other technical solutions. The result, as shown in the figure below, indicated that a significant 65.67% of researchers expressed their concerns about technical challenges, emphasizing that the adoption of advanced tools and technologies may impede the seamless integration of the R&D system. These technologies can be complex to set up and maintain, and they may require substantial investment in terms of infrastructure and expertise.

Data Privacy and Security Concerns: Research and development often involve handling sensitive and confidential data. Ensuring the privacy and security of this data is paramount. Compliance with data protection regulations and safeguarding against breaches or unauthorized access are significant challenges since ensuring the privacy and security of this data is paramount. This study showed that 61.19% of respondents identified data privacy and security as a second top concern, especially when handling sensitive research data.

Lack of Training: Introducing a new R&D management system typically requires comprehensive training for staff and researchers who will use the system. Inadequate training can result in underutilization, errors, and inefficiencies. Some researchers, at 49.25%, shared their concern related to the inadequacy of training for both staff, researchers and public users, which could hinder the effective operation of this national Research and Development (R&D) management system.

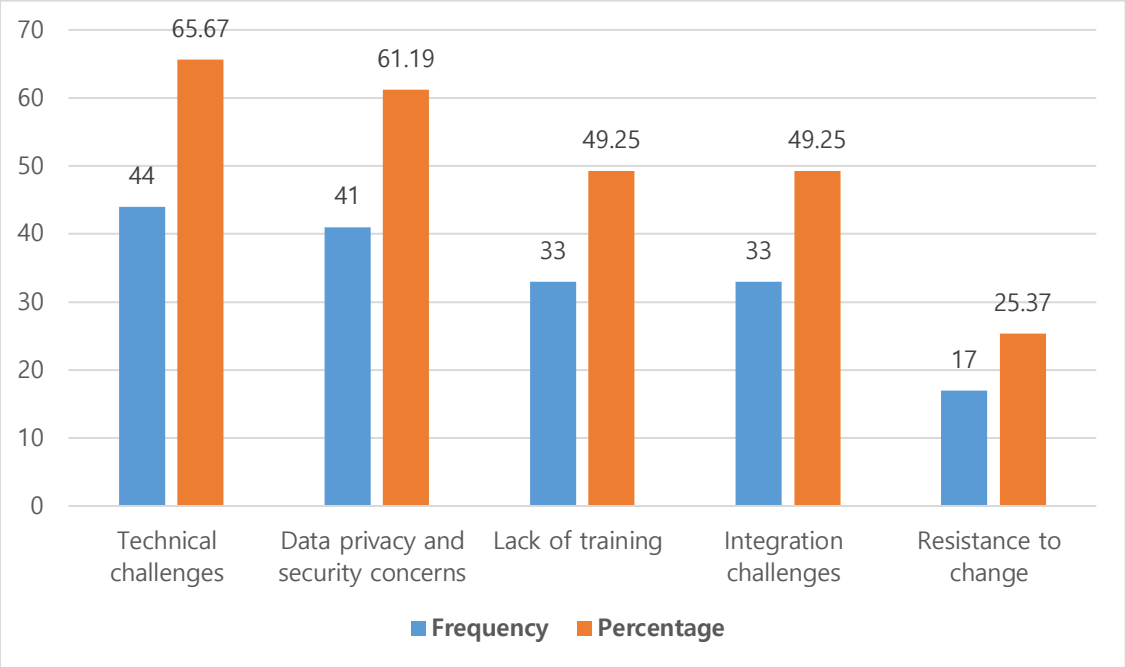
Integration Challenges: The researcher and other users who are from different organizations, departments, and research teams including government, higher education institution and private sector who may have their own existing processes and systems. Integrating these diverse systems and processes into a unified R&D management system can be complex. Particularly, achieving seamless communication and data exchange between these components is a significant challenge. As revealed in the findings, 49.25% of respondents recognized integration challenges as a substantial barrier, given the need to harmonize diverse R&D processes and systems across various organizations and departments.

Resistance to Change: in the reality, people and organizations often resist change, especially when it involves departing from established practices and adopting new ways of working. The result also displayed that 25.37% of researchers considers resistance to change as a significant hurdle. They thought that individuals and institutions may be hesitant to embrace new

approaches and depart from established practices, particularly related to new technology and system.

To overcome these concerns and barriers, a comprehensive strategy is imperative to addresses each concern or barrier, promote awareness and foster collaboration among all stakeholders in the R&D community through balancing the need for data sharing and collaboration with security measures, provision of the comprehensive training programs and effective change management strategies, communication, and leadership.

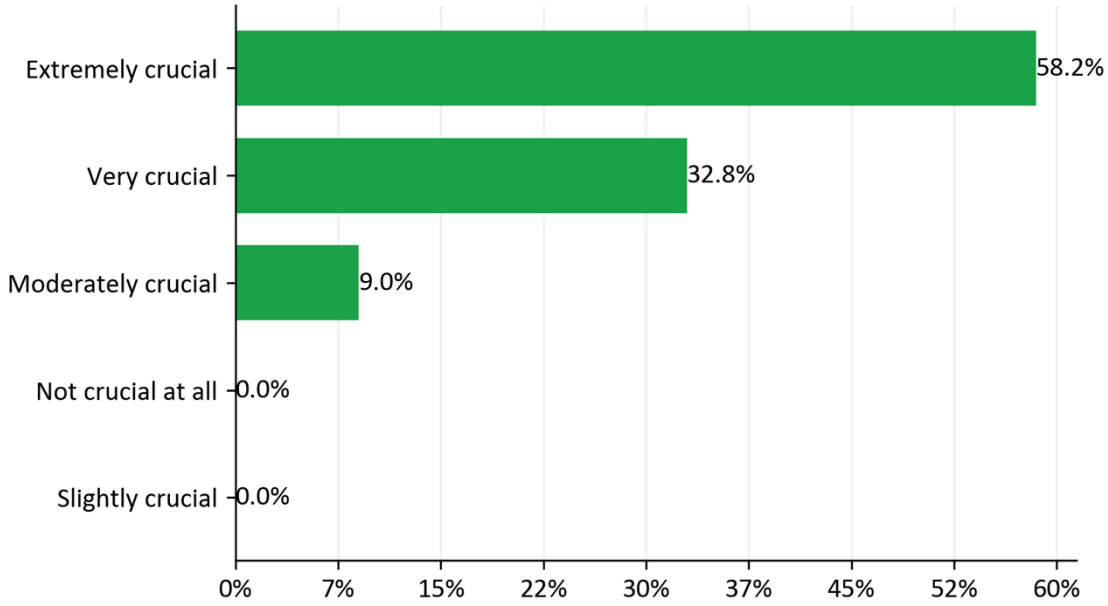
Figure 34: Concerns and barriers of R&D management system



7.2 Institutional leadership in promoting the adoption of an R&D management system

Institutional leadership plays an indispensable role in championing the adoption of a national Research and Development (R&D) management system. The institutional leadership serves as the driving force behind the successful implementation of such a system in the future. As indicated by the research findings in Figure 35, a substantial consensus among researchers is evident, with 58.21% deeming it extremely crucial, 32.84% considering it very crucial, and 8.96% regarding it as moderately crucial.

Figure 35: institutional leadership in promoting the system



7.3 Expected Outcomes

- *Technical aspects*

  • Establishment and operation of system infrastructure through systematic connection and integration of national R&D information and standardization of distribution

  - Securing a science and technology information distribution base that can efficiently collect, manage, and utilize heterogeneous information distributed across research management specialized organizations by institution

  • Comprehensive service of national research-based information and science and technology information for systematic management and utilization of national R&D information

- *Economic Outcomes*

  • Improving national R&D efficiency and productivity

  - Open research management and support through comprehensive analysis of national R&D status and sharing and dissemination of results

  - Enhancing researchers' research productivity and expanding economic and industrial ripple effects through systematic national R&D management and support

• Improving the management and operation efficiency of national R&D information resources

- Reduction of information infrastructure fixed costs by securing interoperability and compatibility of all R&D resources subject to joint utilization, connection, and integration, such as H/W, S/W, and data

o *Social and cultural aspects*

• Establishing a culture of establishing strategies and developing policies at the national level through mutual cooperation across all ministries

• Forming social and cultural consensus through mutual cooperation between industry and academia to strengthen national R&D capabilities from the perspective of the national innovation system.

o *User aspect*

• User

- Contribute to the popularization and everydayization of science and technology by providing easy access to scientific and technological knowledge and information and improving understanding of the status of national R&D projects.

• Industry – Academia - Research officials

- Support for research activities and utilize information through the use of reliable national R&D research results

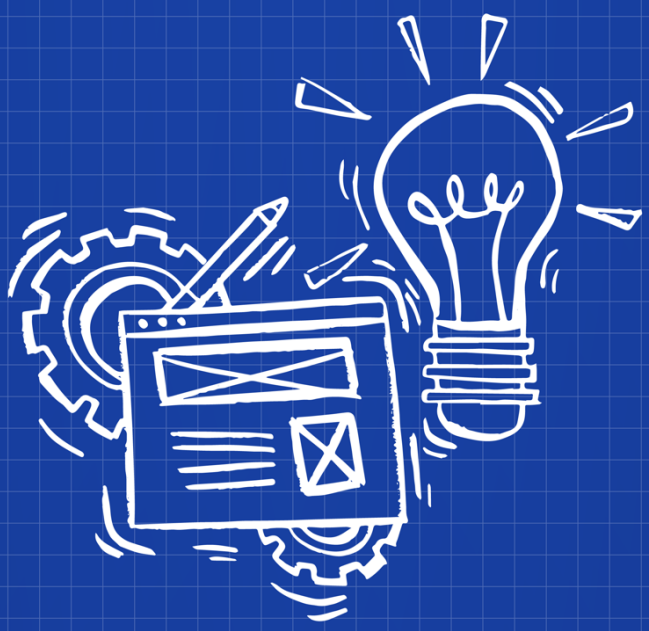
- Solve the problem of insufficient manpower and equipment by jointly utilizing the manpower and equipment owned by universities and research institutes.

• Government

- Analysis of various information for national R&D policy development and securing transparency of business progress.

CHAPTER 8

RECOMMENDATIONS AND CONCLUSION



The blueprint presents the required functionalities of the Research and Development (R&D) Management System and offers an overview of the transformative future for the landscape of scientific direction that is envisioned by the research community in Cambodia. The consensus building process among the respondents of the survey and collective insights from the experts in the consultative workshop underscores the critical importance of an ideal R&D management system that can effectively address the evolving needs and tackle the challenges of researchers in the country. Key insights from this survey reflect a collective demand of the research community for a dynamic and collaborative platform that integrates various aspects of the research process.

The emphasis on features such as a robust research database, project proposal submission, resource allocation management, real-time publication and citation tracking, database of researcher expertise profile, and integration with funding sources demonstrates a clear vision for a robust R&D ecosystem that caters to the needs of diverse researchers and scientists. This ideal system serves as a catalyst for creativity, encouraging interdisciplinary collaboration, increasing transparency, and promoting effective resource utilization.

As we navigate the future of the research landscape in Cambodia, it is clear that the ideal R&D management system, as envisioned by the research community, will play a critical role in determining how information is generated, shared, and implemented. The survey results provide useful information for stakeholders and developers to align their efforts with the real needs and goals of researchers. To achieve the optimal result and the widespread use of the system and long-term sustainability, the proposed system must be adaptable to changing technologies, support diverse research methodologies, and, most importantly, be user-friendly.

The blueprint also provide a roadmap for developing and implementing an R&D management system that is aligned with the dynamic and collaborative framework of the research that reflects the needs of the researchers. The shared vision of the research community provides a basis for fostering innovation, promoting technology transfer, leveraging scientific progress, and contributing to the ultimate goal for socio-economic development.

The blueprint of National Research and Development (R&D) Management System emphasizes the essential qualities and functionalities that directly beneficial to researchers and scientist community, that in turn contribute to socio-economic development and achieving SDGs. These revelations highlight how such a system could completely transform the field of research. The following characteristics are the top priorities for National Research and Development Management System, aligning with the demands of researchers and scientist community in Cambodia:

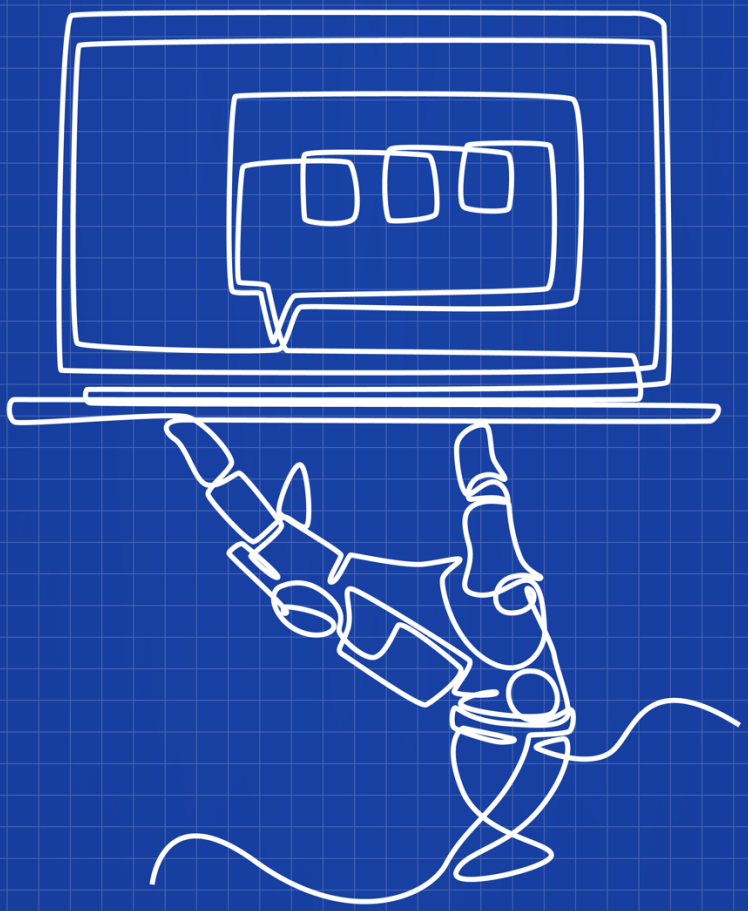
- **Research Database:** Most respondents emphasize how crucial it is for the R&D management system to have a comprehensive research database. A centralized repository for keeping and organizing study data, methods, conclusions, and related

documentation would be provided by this database. Scholars foresee a dynamic, intuitive platform that allows them to efficiently and safely archive their research findings. In order to facilitate smooth data retrieval and cooperation, the system should allow the structured storing of a variety of data kinds, from experimental results to book references. This feature is thought to be essential for maintaining research knowledge and encouraging cooperation both inside and across research teams and organizations.

- **Project Proposal Submission:** The ideal R&D management system should include an integrated project proposal submission system, according to survey respondents. This feature would make it easier to submit, evaluate, and manage proposals for research projects. Researchers see a platform where they may draught and submit proposals for new initiatives, monitor the status of the proposal, and get input from funding organizations or other researchers. It is anticipated that the incorporation of this feature will augment transparency, expedite financing prospects, and encourage the effective distribution of resources towards inventive research undertakings.
- **Resource Allocation Management:** One important component of the R&D management system is resource allocation management. The need of having a structure in place that can effectively distribute resources like money, staff, gear, and lab space is emphasized by the respondents. Real-time tracking and resource optimization should be possible with such a system, guaranteeing that researchers have what they need to do their work efficiently. It is envisaged that a dynamic resource allocation system will lessen resource waste, improve project efficiency, and eliminate bottlenecks.
- **Publication and Citation Database:** The inclusion of a comprehensive publication and citation database is seen as fundamental. Researchers desire a system that seamlessly tracks their publications, manages citation data, and supports the referencing of their own work. This feature aids in keeping researchers informed about the impact of their research, simplifies citation management, and ensures accurate attribution of intellectual contributions. Furthermore, it can foster collaboration by identifying synergies with other researchers and their work.
- **Researcher Expertise:** Respondents to the survey highlights the significance of a feature that allows the system to profile and showcase the individual researchers' areas of expertise. With this feature, researchers might highlight their contributions, interests, and abilities, which would make it simpler for possible partners to find subject matter experts. This function can increase researcher synergy and knowledge sharing by promoting links and multidisciplinary collaboration.
- **Integration with Funding Sources:** One of the top priorities is integrating the R&D management system with different financing sources. The goal of research is to optimize grant application, financing management, and project financial tracking procedures. Through this integration, financial resources would flow smoothly, compliance with funding regulations would be made easier, and researchers would have direct access to funding options. It is thought to be necessary for the long-term viability of inventions and research initiatives.

In conclusion the ideal research and development (R&D) management system for the research community would encompass these essential components to foster an efficient, collaborative, and effective research environment. These features will empower researchers, enhance research outcomes, and stimulate innovation across various fields, ultimately contributing to sustainable and inclusive development. However, to establish a robust R&D ecosystem in Cambodia, the following key initiatives are crucial including: strengthening institutional leadership and coordination, ensuring sustainable funding mechanisms, promoting stakeholder engagement and capacity building, and establishing clear policies for data sharing, intellectual property, and collaboration.

APPENDIX



The Ministry of Industry, Science, Technology & Innovation (MISTI), with the collaboration of Science & Technology Policy Institute (STEPI) of the Republic of Korea, is conducting the survey on Research and Development (R&D) Management System for Cambodia. We are looking for building an ideal research management platform to support and promote research activities in Cambodia. Hence, this survey has been designed to gather your valuable insights and opinions regarding the management of research projects and the systems that support research activities.

The research objectives are to:
1. Assess the current practices and challenges in managing research projects.
2. Identify the features and functionalities that are most crucial in an ideal R&D management system.
3. Gather your thoughts on how such a system can better serve the research community.

Your participation in this survey is vital. Your experiences, preferences, and suggestions will help shape the development of R&D management systems that are tailored to meet the specific needs of researchers, research teams, and institutions. Please rest assured that your response will be kept confidential and used solely for research purposes.

Thank you for your time and participation.

General Department of Science, Technology and Innovation, MISTI

Section 1: General Information

1. Name:
2. Gender:
    2.1. Male
    2.2. Female
3. Age:
    3.1. Less than 25
    3.2. 25-34
    3.3. 35-44
    3.4. 45-54
    3.5. More than 54
4. Title:
    4.1. Mr.
    4.2. Ms.
    4.3. Mrs.
    4.4. Dr.
    4.5. Assist. Prof.
    4.6. Assoc. Prof.
    4.7. Professor
5. Current Position:
6. Email:
7. Affiliated Institution/Organization:
8. Field/Area of Research:
    1. Agriculture, forestry, fisheries
    2. Biotechnology
    3. Chemical Engineering
    4. Chemical Sciences
    5. Civil Engineering
    6. Clinical Medicine
    7. Computer and Information Sciences
    8. Economics and Business
    9. Educational Sciences
    10. Electrical and Electronic Engineering
    11. Environmental Sciences
    12. Environmental Engineering
    13. Food Engineering
    14. Health Sciences
    15. Politics
    16. Social and Economic Geography
    17. Sociology

18. Other (Please specify:)

9. Years of Experience in Research:
   - 9.1. Less than 5 years
   - 9.2. 5-10 years
   - 9.3. More than 10 years
10. Highest Academic Qualification:
   - 10.1. Bachelor
   - 10.2. Master
   - 10.3. PhD
   - 10.4. Postdoc researcher
11. Are you involved in collaborative research projects with other institutions or researchers?
   - 11.1. Yes
   - 11.2. No
12. Does your Institution/Organization provide research grants/funding?
   - 12.1. Yes
   - 12.2. No
13. Where do you publish research findings?
   - 13.1. In international peer-reviewed journals
   - 13.2. In national peer-reviewed journals
   - 13.3. In international Conferences and workshops
   - 13.4. In national Conferences and workshops
   - 13.5. On online research networks
   - 13.6. Other (please specify…..)
14. How frequently do you publish your research findings?
   - 14.1. Very frequently (more than 3 per year)
   - 14.2. Frequently (1-3 per year)
   - 14.3. Occasionally (1 every 2 years)
   - 14.4. Rarely (1 every 3-5 years)
   - 14.5. Never
15. Have you previously used any form of digital tools or systems for research management?
   - 15.1. If Yes:
     - 15.1.1. Institutional management system
     - 15.1.2. Available website/online platform
     - 15.1.3. Other (please specify)
   - 15.2. No, never

Section 2: Current Practices of Research System and Challenges

16. What is the nature of your research projects? MC

16.1. Fundamental research
16.2. Applied research
16.3. Experiment laboratory
16.4. Policy research
16.5. Social research
16.6. Clinical research
16.7. Other (please specify)

17. Do you or your organization have any collaborative research projects?
17.1. Yes
17.2. No

18. How does your organization seek for collaboration in the research project? MC
18.1. Announcement
18.2. Networking
18.3. Former Colleagues
18.4. Online Platform (Researchgate, LinkedIn, Google Scholar)
18.5. Social Media (FB, IG, Twitter, Telegram, Line etc.)
18.6. MoU
18.7. Other (please specify……)

19. What is the primary funding source for your research?
19.1. Government fund
19.2. Development partner
19.3. Private sector
19.4. Call for proposal
19.5. Fund competition
19.6. Other (please specify))

20. How do you proceed with intellectual property (IP) considerations related to your research outcomes?
20.1. Ministry
20.2. IP office on-campus
20.3. Provincial department
20.4. One-window service
20.5. Intermediary and broker
20.6. International organization
20.7. Other (please specify……..)

21. What challenges do you face in your current R&D management?
21.1. Inefficiency in resource allocation
21.2. Difficulty in access to funding
21.3. Difficulty in seeking collaboration
21.4. Complicated administrative procedure
21.5. Inefficiency in data management

21.6. Other (please specify……..)

22. How challenging do you face in securing research funding for your projects?
    22.1. Very challenging
    22.2. Somewhat challenging
    22.3. Neutral
    22.4. Somewhat not challenging
    22.5. Not challenging at all
23. How does your organization report annual R&D activities and performance?
    23.1. Manual staff report submission
    23.2. Open online platform
    23.3. Institutional platform
    23.4. Not relevant
24. Are there any procedures for managing (such as: registering, verifying) research outcomes in your organization?
    24.1. Yes
    24.2. No

    If Yes, Please explain:
25. What tools or methods do you use for tracking the progress and milestones of your research projects?
    25.1. Manual tracking method like spreadsheet
    25.2. Institutional tracking system
    25.3. Online tracking system
    25.4. Project management tools
    25.5. Other (please specify……..)
26. In your opinion, do you think the National R&D Management System is important for researchers and research institutions in Cambodia?
    26.1. Very important
    26.2. Important
    26.3. Neutral
    26.4. Somewhat not important
    26.5. Not important at all

Section 3: Ideal R&D Management System

27. In your opinion, what specific features could an R&D management system offer to researchers like yourself (please rank from 1-5 of its importance)?
    - 27.1. Project proposal submission
    - 27.2. Resource allocation management
    - 27.3. Real-time progress tracking
    - 27.4. Integration with funding source
    - 27.5. Integration with research database
    - 27.6. Data analysis and visualization
    - 27.7. Publication and citation management
    - 27.8. Collaborative seekers
    - 27.9. Demand and supply matching
    - 27.10. IP management
    - 27.11. Rewarding and recognition system
    - 27.12. Categorization of R&D fields
    - 27.13. Researcher expertise profiles
28. Please rank the function above from 1-5 based on its importance?
    - 28.1. Project proposal submission
    - 28.2. Resource allocation management
    - 28.3. Real-time progress tracking
    - 28.4. Integration with funding source
    - 28.5. Integration with research database
    - 28.6. Research database
    - 28.7. Data analysis and visualization
    - 28.8. Publication and citation management
    - 28.9. Collaborative seekers
    - 28.10. Demand and supply matching
    - 28.11. IP management
    - 28.12. Rewarding and recognition system
    - 28.13. Categorization of R&D fields
    - 28.14. Researcher expertise profiles
29. What challenges do you believe an R&D management system could address in terms of project planning and execution(MC)?
    - 29.1. Improved project planning and tracking
    - 29.2. Enhanced collaboration and communication
    - 29.3. Efficient resource allocation
    - 29.4. Integration with funding sources
    - 29.5. Better publication tracking
    - 29.6. R&D database

29.7. IP management
29.8. Other (please specify……)

30. Would integration with external funding sources and grant management systems be valuable for your research work?
30.1. Very valuable
30.2. Valuable
30.3. Neutral
30.4. Somewhat not valuable
30.5. Not valuable at all

31. What role should data visualization and analytic capabilities play in an R&D management system?
31.1. For tracking
31.2. For evaluating
31.3. For decision- making
31.4. Easier to comprehend
31.5. Somewhat not necessary
31.6. Not necessary at all

32. Would integration with citation databases and publication tracking tools be beneficial for your research?
32.1. Very beneficial
32.2. Beneficial
32.3. Neutral
32.4. Somewhat not beneficial
32.5. Not beneficial at all

33. What additional tools or features could an R&D management system offer to support open science initiatives? (MC)
33.1. Integration with open repository
33.2. Real-time open access publication tracking
33.3. Collaboration with local and international researchers
33.4. Research trend analysis
33.5. Smart search
33.6. Other (please specify……..)

34. Could an R&D management system assist with the identification of potential research partners or collaborators across different fields?
34.1. Yes, through integration with platform like LinkedIn and researchgate,
34.2. Yes, through researcher profiles,
34.3. Yes, through researcher publication history
34.4. No, not at all

35. Are there any features you consider essential that have not been covered in the previous questions?

36. Is there anything else you would like to share about your expectations and hopes for an R&D management system?

Section 4: R&D Management System Challenges

37. What concerns or barriers might researchers/institutions face when transitioning to using an R&D management system?
    37.1. Technical challenges
    37.2. Resistance to change
    37.3. Lack of training
    37.4. Data privacy and security concerns
    37.5. Integration challenges
    37.6. Others (please elaborate…….)
38. In your opinion, how crucial is the role of institutional leadership in promoting the adoption of an R&D management system?
    38.1. Extremely crucial
    38.2. Very crucial
    38.3. Moderately crucial
    38.4. Slightly crucial
    38.5. Not crucial at all

Do you have any more suggestions and recommendations on the national R&D management system?

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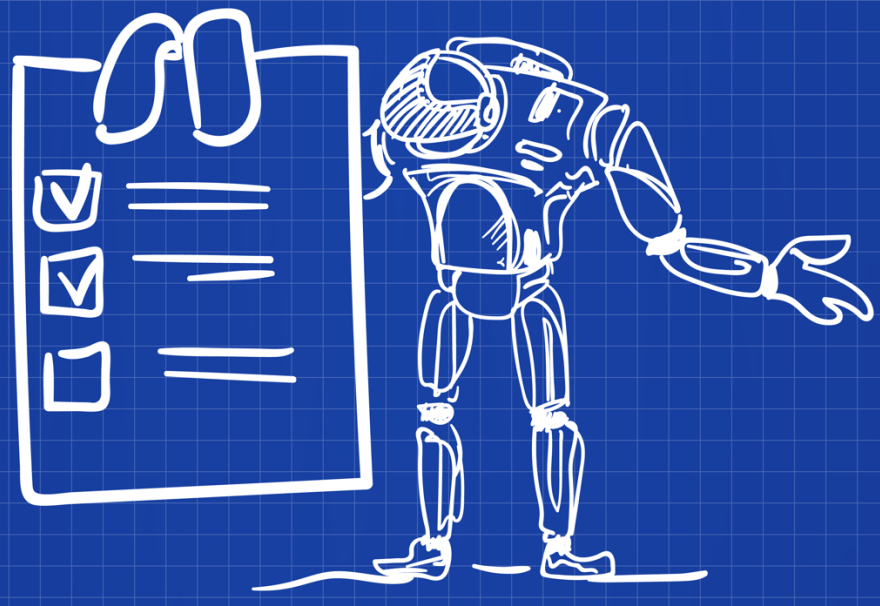
LIST OF PARTICIPANTS



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1	Project Lead	University California San Francisco
2	Lecturer	Royal University of Phnom Penh
3	Member	Ministry of Commerce, Cambodia
4	Researcher	Cambodia Academy of Digital Technology
5	Research Coordinator	Cambodia Academy of Digital Technology
6	Deputy Chief Officer	MPWT
7	Researcher and Lecturer	CADT
8	Dean	Pannasastra University of Cambodia
9	Director	CDRI
10	Researcher	Water and Environment Research Unit
11	Deputy Director	NISTI/MISTI
12	Head research unit	ITC
13	Researcher/Lecturer	CADT
14	Senior Research Fellow	ADIC
15	Lecturer	Institute of technology of Cambodia
16	Director	Green Move Consulting
17	Data Science Researcher	CADT
18	Director	Institute of Police Science Research, Police Academy of Cambo
19	Deputy Chief Bureau of National F	Ministry of Public Works and Transport
20	Post-Doc researcher	Chonnam National University
21	Chief of Research and developme	National Institute of Science, Technology and Innovation (NIST
22	Chief Officer	National Institute of Science, Technology and Innovation
23	Assistant to President	Royal Acaddemy of Cambodia
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25	GIS and Remote Sensing Specialist	Wildlife Conservation Society (WCS)
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28	Lecturer researcher	Institute of Technology of Cambodia
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45	Assistant Professor and Group Lea	Royal University of Phnom Penh
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48	English Instructor	Army Institute
49	Deputy head of department	RUPP
50	Head of Research Unit	Institute of Technology of Cambodia
51	Person in Charge, Graduate Schoo	Royal University of Phnom Penh
52	Vice dean	Royal University of Phnom Penh
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62	Researcher	MISTI
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64	Uss	Misti
65	Head Dynamics and Control Labo	Institute of Technology of Cambodia
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67	Director of Department	MISTI