



# THE RESEARCH ECOSYSTEM OF CAMBODIA





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# The Research Ecosystem of Cambodia



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# FOREWORD

A national innovation system grounded on a solid research framework is essential to deliver inclusive and sustainable development and create a resilient nation capable of navigating the uncertainties and opportunities of the Fourth Industrial Revolution. The Royal Government of Cambodia believes that the curiosity and determination of Cambodian researchers, innovators and entrepreneurs are its greatest assets to regain the economic momentum lost during the COVID-19 pandemic and prepare the nation for present and future economic, societal and environmental challenges.

The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) is also committed to fostering research, science, technology and innovation (STI) for sustainable and inclusive development. As part of its mission, ESCAP has been partnering with Cambodia's Ministry of Industry, Science, Technology & Innovation (MISTI) to support the development of landmark studies and evidence-based policies capable of unlocking the creative potential of the Cambodian people and guiding it towards the realisation of Cambodia's Vision 2050.

*The Research Ecosystem of Cambodia* report is the latest outcome of this fruitful partnership. This study analyses the strengths, weaknesses, opportunities and threats to research in Cambodia, providing strategic recommendations for priority research areas and policy mechanisms tailored to the national context. This background report also serves as the analytical foundation of Cambodia's National Research Agenda 2025 - a key initiative proposed in Cambodia's Science, Technology & Innovation Roadmap 2030 - to enhance and direct research efforts in Cambodia.

Moreover, this report is also a testimony to the commitment of ESCAP and the Royal Government of Cambodia to work together for the benefit of all Cambodians, leaving no one behind. As the country emerges from the blight of the pandemic, may this be a valuable tool for policymakers to develop effective policies that maximise national research capabilities and bring forth the prosperous nation that Cambodia aspires to become.

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This analytical report was drafted in 2021 to provide background information for the formulation of Cambodia's National Research Agenda 2025. The analysis incorporates insights gathered during the process of co-creating the agenda, and the data and perspectives shared by experts, researchers, academics and government officials.

To prepare this background report a survey was sent to 36 participants from three stakeholder groups: Academia, the private sector, and line ministries. Each participant responded based on behalf of the institutions they represent. A total of 27 responses were received (75 per cent response rate). The survey was hosted online and contained a mixture of open and closed questions concerning the main components of the research ecosystem. Moreover, in-depth stakeholder interviews with governmental stakeholders complemented the findings of the stakeholder survey. See Appendix B for a complete list of the survey respondents and stakeholders interviewed.

# DEFINITIONS

**Research** comprises the creative and systematic work undertaken to increase the stock of knowledge - including knowledge of humankind, culture and society - and devise new applications of available knowledge.

**Researchers or research staff** are professionals engaged in the conception or creation of new knowledge. They conduct research and improve or develop concepts, theories, models, techniques instrumentation, software or operational methods.

**Knowledge** encompasses the established facts, concepts, ideas and theories about certain aspects of the world. Knowledge usually includes theoretical concepts and ideas as well as practical understanding based on the experience of having performed certain tasks. Disciplinary knowledge includes subject-specific concepts and detailed content, such as that learned in the study of mathematics and language. Interdisciplinary knowledge involves relating the concepts and content of one discipline/subject to the concepts and content of other disciplines/subjects. Epistemic knowledge is the understanding of how expert practitioners of disciplines work and think. This knowledge helps students find the purpose of learning, understand the application of learning and extend their disciplinary knowledge. Procedural knowledge is the understanding of how something is done, the series of

steps or actions taken to accomplish a goal. Some procedural knowledge is domain-specific, some is transferable across domains.

**Innovation**, as defined by the Oslo Manual 2018, refers to 'a new or improved product or process (or combination thereof) that differs significantly from the unit's<sup>1</sup> previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)'. Therefore, materialization of knowledge from research in the form of serving market or process changes with socio-economic development is the foundation of innovation. Innovation is conducted by users, suppliers and consumers everywhere - in government, business and non-profit organizations, and across borders, sectors, and institutions. The Oslo manual identifies eight broad types of activities that can be undertaken in pursuing innovation: 1. research and experimental development (R&D) activities; 2. engineering, design and other creative work activities; 3. marketing and brand equity activities; 4. IP-related activities; 5. employee training activities; 6. software development and database activities; 7. activities related to the acquisition or lease of tangible assets; and 8. innovation management activities

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<sup>1</sup> The unit can be a firm, government unit, a non-profit institution or a household.

# EXECUTIVE SUMMARY

Research is vital for the socio-economic development of Cambodia. Research enables the accumulation of industrial and financial capital, and development of human capital and allows businesses, institutions, and nations to be competitive. Research and development (R&D) activities are also essential for the generation of new knowledge and instruments necessary to address critical social challenges, from responding to Covid-19 to mitigating and adapting to climate change. Long term investments in research capabilities will benefit companies, citizens, governments and enable the achievement of Cambodia's Vision 2050.

The Royal Government of Cambodia is seeking to strengthen the national innovation ecosystem and in July 2021 approved the Science, Technology & Innovation Roadmap 2030, a strategic document to guide the implementation of its National Science, Technology and Innovation Policy 2020-2030. One of the critical actions identified in the Roadmap is to adopt a shared national research agenda to strengthen research capacity and quality and set the strategic direction for research activities.

This background report provides the evidence and analytical framework for the formulation of the national research agenda, outlining the current research ecosystem of Cambodia and presenting recommendations on how it can be strengthened.

The analysis of the research ecosystem was conducted around nine building blocks, and the following is a summary of key findings.

**Research organisations:** The Royal Academy of Cambodia, research institutes, universities and other higher education institutions (HEIs), civil society organisations, non-governmental organisations, and think tanks are the main research-producing organisations in Cambodia. Despite specific policy efforts, Cambodian HEIs enjoy less autonomy than their counterparts in other ASEAN countries. And whereas Cambodian HEIs consider research necessary, they often focus more on teaching than research, particularly in private institutions. Moreover, research infrastructure (laboratories, experimental equipment, computers, libraries, access to journals and databases) needs to be further developed to meet researcher needs.

**Research topics:** There is a misalignment between the strategic research topics relevant to national development and what is being taught and researched in HEIs. More directionality is needed to better align investments in research with national development goals.

**Researchers:** Cambodia has one of the lowest numbers of researchers per million inhabitants of the ASEAN countries, with 30 researchers per million or 500 researchers in total. Furthermore, only 3 per cent of higher education instructors have a doctoral degree, and women are under-represented. Work in HEIs is challenging as faculty struggle with a low salary and a high teaching workload that leaves little time for research. The number of doctoral students is low (although increasing), and the capacity to train them is still inadequate.

**Research funding:** Gross domestic expenditure on research in Cambodia is 0.12 per cent of GDP (2015), the second-lowest in the ASEAN region. Thirty-five per cent of this funding comes from foreign partners and international organisations, which has implications for the research topics funded and the time frame of the projects (often short-term).

**Research quality and performance:** Research output in Cambodia is following an upward trend since 2000, with increasing international collaboration. However, Cambodia's research quality suffers from inconsistent application of ethics guidelines, weak data quality, and language barriers.

**Researcher mobility and international collaboration:** ASEAN has played a key role in Cambodia's increased international research collaborations via student exchanges and university twinning programmes. Still, there are several barriers to expand the mobility for Cambodian researchers (particularly outside ASEAN) such as a lack of knowledge of opportunities and time to apply for them, language barriers, and differences in job conditions across countries.

**Academia-industry collaboration:** Entrepreneurial activities in Cambodian HEIs are still emergent. In recent years, incubators, start-ups and industry linkage offices have been set up to increase academia-industry

collaboration. However, researchers lack incentives to collaborate with the industry.

**Academic input for policy:** The contribution of academic research to government policy could be improved. In general, research produced by NGOs has more impact on policy than that generated by universities and research institutes (due to NGOs having more time and money to conduct and disseminate quality research).

**Research policy and regulatory frameworks:** The Education Strategic Plan 2019-2023 contains nine strategic reforms relating to higher education, one of which is to “promote the quality of research” by establishing research centres of excellence in HEIs and creating a national fund for research in higher education. Relatively efficient procedures for registering and enforcing intellectual property rights are in place, and Cambodia’s intellectual property laws are advanced compared to other ASEAN countries.

Based on this analysis, the following recommendations are proposed:

- **Align research topics with national developmental needs:** Define mission-oriented research to respond to the development challenges of Cambodia and ensure that impactful research is conducted.
- **Introduce a research fund to finance the national research agenda** managed by a research fund committee and providing clear and accessible procedures for researchers.
- **Clarify the roles, mandates, means, objectives and budgets of government research institutes:** Increase the proportion of funds provided towards applied research (70 per cent towards applied research); publicly-funded research and training organisations should facilitate the application of research findings to applied industrial contexts.
- **Select some publicly-funded research and training organisations to become centres of excellence in research, providing them with adequate funding,** sophisticated equipment and ensuring the hiring of a qualified and gender-balanced body of researchers.
- **Introduce an attractive research career system and incentives for researchers,** such as PhD funding, grants, and reward programmes to valorise careers in research.
- **Incentivise the private sector to conduct research in collaboration with academia** by promoting intellectual property protection mechanisms, offering grant schemes dedicated to academia-industry research, and developing an online platform for researchers, government, and private sector to collaborate and match needs with skills.
- **Develop strong international university networks** and provide researcher mobility schemes to further promote international research collaboration.
- Create an environment to support visiting researchers through facilitating working permits.
- **Inform and train policymakers to integrate research into policymaking** by identifying policy research needs, funding translational research, establishing permanent communication channels between researchers and policymakers, and establishing a research ethics committee.



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# ABBREVIATIONS

ARC	Amru Rice Cambodia Co., Ltd.
ASEAN	Association of Southeast Asian Nations
AVI	Asian Vision Institute
CCC	Cambodia Chamber of Commerce
CDRI	Cambodia Development Resource Institute
CSDG	Cambodia Sustainable Development Goals
ERW	Explosive Remnants of War
ESCAP	Economic and Social Commission for Asia and the Pacific (United Nations)
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on Research and Development
HEI	Higher Education Institution
ICT	Information and communication technologies
IP	Intellectual Property
ITC	Institute of Technology of Cambodia
MAFF	Ministry of Agriculture Forestry and Fisheries
MEF	Ministry of Economy and Finance
MFAIC	Ministry of Foreign Affairs and International Cooperation
MISTI	Ministry of Industry, Science, Technology & Innovation
MLVT	Ministry of Labour and Vocational Training
MME	Ministry of Mines and Energy
MOC	Ministry of Commerce
MoEYS	Ministry of Education, Youth and Sport
MOH	Ministry of Health
MOI	Ministry of Interior
MOP	Ministry of Planning
MOWRAM	Ministry of Water Resources and Meteorology
MPTC	Ministry of Post and Telecommunications
MPWT	Ministry of Public Works and Transport
MRG	Mong Rethy Group Co., Ltd.
MSME	Micro, Small and Medium-sized Enterprises
NIPTICT	National Institute of Post and Telecommunication and ICT
NPIC	National Polytechnic Institute of Cambodia
OECD	Organisation for Economic Co-operation and Development
PAI	Public Administrative Institution
R&D	Research and Development
RS-IV	Rectangular Strategy, Phase IV
RUA	Royal University of Agriculture
RUPP	Royal University of Phnom Penh
SDG	Sustainable Development Goals
SME Bank	Small and Medium Enterprise Bank of Cambodia
SMEs	Small and Medium-size Enterprises
STEM	Science, Technology, Engineering and Mathematics
STI	Science, Technology and Innovation
TVET	Technical and Vocational Education and Training
UHS	University of Health Sciences
UICC	University Industry Cooperation Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization
VAT	Value Added Tax

# CHAPTER

# 1

# CONTEXT OF CAMBODIA'S RESEARCH ECOSYSTEM

## 1.1 WHY RESEARCH AND DEVELOPMENT MATTERS

Research and development (R&D), innovation, productivity, growth, and income are distinct but closely related phenomena that reinforce each other.<sup>2</sup> R&D refers to creative and systematic activities to produce new knowledge or new applications for existing knowledge.<sup>3</sup> It is usually classified into basic, applied, and experimental research. While R&D may be part of innovative activities, this is not systematically the case, as innovative activities also include efforts unrelated to R&D, such as equipment acquisition, machinery, training, design, and marketing.

Research, development, and innovation are key elements to solving current and future economic and societal challenges.<sup>4</sup> They are even more critical for complex challenges that require multi-disciplinary research and cooperation across countries.<sup>5</sup> By

cooperating with different sectors, disciplines and countries, the pace of discovery and the transfer of knowledge increases.

The economic development of a country occurs through different mechanisms, including innovation, accumulation of industrial and financial capital, and development of human capital<sup>6</sup>. R&D is vital for this process as it allows businesses, institutions, and nations to become competitive.<sup>7</sup> Moreover, there are other benefits from investing in R&D that contribute directly to socio-economic development, such as skills development, and the generation of new knowledge, methodologies, instruments, and businesses. Such investments are also multipliable as they tend to spill over to multiple companies, suppliers and customers.

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<sup>2</sup> United Nations Educational, Scientific and Cultural Organization Institute of Statistics. Higher Education in Asia: Expanding out, expanding up. The rise of graduate education and university research. 2014. pp. 49.

<sup>3</sup> Organisation for Economic Co-operation and Development. The Measurement of Scientific, Technological and Innovation Activities Oslo Manual. 2018.

<sup>4</sup> Organisation for Economic Co-operation and Development. *Assessing the Socioeconomic Impacts of Public R&D*. Paris, 2008.

<sup>5</sup> European Union. Research and innovation: Leading Innovation through EU Research.

<sup>6</sup> Gur, Betül. The Impact of R&D Expenditures on Development: A Case of Turkey. *International Journal of Humanities and Social Science Invention*, vol. 6, No. 4. 2020.

<sup>7</sup> Organisation for Economic Co-operation and Development. *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development*, The Measurement of Scientific, Technological and Innovation Activities, OECD Publishing, Paris, 2015.

## 1.2 HISTORICAL, POLITICAL, ECONOMIC, AND CULTURAL BACKGROUND

The first iteration of Cambodia's modern higher education system started in the 1960s. During this period, eight universities were established, reaching an enrolment rate of between 5,300 to 14,560 students by the end of the decade.<sup>8</sup> However, the educational system was dismantled when the Khmer Rouge controlled the country from 1975 to 1979. During this period, education beyond a limited primary level and technical skills was censured by the Khmer Rouge regime and displays of higher education knowledge were actively repressed.<sup>9</sup> Moreover, following the end of the Khmer Rouge rule and the establishment of the People's Republic of Kampuchea, a series of embargos prevented direct assistance from reaching the country between 1979 to 1989, with the exception of support from the Soviet Bloc.<sup>10</sup>

Substantive aid from other countries only arrived after the embargos were lifted, and the re-establishment of the Kingdom of Cambodia enabled the educational system to be revitalized. After 1997, two major policy changes led to a rapid expansion of the Cambodian

higher education system. First, the Government allowed public universities to admit fee-paying students (in addition to state-supported students). Second, the Government opened up the market for private institutions to be established. These changes were part of a broader movement to consolidate a market-based economy in Cambodia. From the 1990s to the early 2000s, Cambodian higher education institutions (HEIs) were particularly reliant on assistance from developed countries, and as such, foreign dominance over higher education increased with overseas universities, foreign-based religious groups, private investors, and international NGOs competing for student enrolments. This foreign influence has impacted the research topics funded – international donor support may favour topics that are not aligned with the country's long-term needs, and is often short-term in terms of the research funding period. Indeed, it has been argued that international donor-funded research projects over-emphasize donor concerns at the expense of researcher concerns and questions.<sup>11</sup>

## 1.3 CURRENT NATIONAL ENGAGEMENT TOWARDS DEVELOPING RESEARCH CAPABILITIES

This section presents the key national strategies related to research. The main goals of each strategy are identified below, and their implementation will be analysed in the next section.

### Overarching engagement

The Royal Government of Cambodia supports national development by formulating and implementing diverse overarching strategies at the national level. The Cambodian vision to become an upper-middle economy by 2030 (Vision 2030) and a high-income economy by 2050 (Vision 2050) is supported by the

Rectangular Strategy Phase IV (RS-IV) and the National Strategic Development Plan (NSDP). Together with the Cambodian Sustainable Development Goals (CSDGs), they are the key strategic documents for enhancing national socio-economic development.

- Rectangular Strategy for Growth, Employment, Equity and Efficiency: Phase IV

The Rectangular Strategy for Growth, Employment, Equity and Efficiency: Phase IV (RS-IV), is one of the core policies steering national efforts to accomplish Cambodia's Vision 2030 and 2050.<sup>12</sup> The Rectangular Strategy has been developed around four main axes

<sup>8</sup> Ibid.

<sup>9</sup> Vickery, Michael. *Cambodia 1975 – 1982*. Chiang Mai, Thailand: Silksworm Books. 1999. pp. 185.

<sup>10</sup> Clayton, Thomas. *Cambodians and the occupation: Responses to and Perceptions of the Vietnamese Occupation, 1979-89*. *Southeast Asia Research*, vol. 7, No. 3. 1999.

<sup>11</sup> Cambodian Institute for Cooperation and Peace. *Doing Research in Cambodia: Making Models that Build Capacity*. 2016.

<sup>12</sup> Government of the Kingdom of Cambodia. *Rectangular Strategy for Growth, Employment, Equity and Efficiency: Building the Foundation Toward Realizing the Cambodia Vision 2050*. 2018.



(rectangles): (1) human resource development; (2) economic diversification; (3) private sector and job development; and (4) inclusive and sustainable development. It aims to reach four strategic goals: (1) An annual growth of seven 7 per cent and enhancing competitiveness; (2) improving the quality and quantity of jobs in particular for the youth; (3) reduce poverty below the 10 per cent threshold; and (4) strengthen public institutions' governance and capacity.

The RS-IV has defined mechanisms to promote research. Under the human resources axis, the strategy seeks to improve research on teaching methods, boost research capacity building and research funds in higher education and enhance health research with a focus on diseases. Under the sustainable development axis, the strategy seeks to promote research in the agricultural sector, increase agricultural land's potential, and preserve Cambodia's cultural heritage.

- National Strategic Development Plan 2019-2023

The National Strategic Development Plan (NSDP) 2019-2023 has been designed to contribute to the implementation of the RS-IV and achieve the CSDGs. The priorities of the strategy 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.

One of the critical actions of the strategy is to enable effective and efficient research at the national level. The strategy includes provisions to promote research, the transfer of technologies from abroad, and the creation of research funds. Moreover, the strategy foresees the strengthening of research institutions, the implementation of research programmes, and the commercialisation of results.

- Cambodia Sustainable Development Goals Framework 2016-2030<sup>13</sup>

The Cambodia Sustainable Development Goals Framework for 2016-2030, together with the RS-IV, set the foundation for the NSDP 2019-2023. The framework establishes 18 Cambodian sustainable development goals - the 17 global goals and an additional one related to mine action and other explosive remnants of war (ERWs). It contains 105 targets, two of which have a research component. One of the targets aims to increase investment in

agricultural research to "end hunger, achieve food security, and promote sustainable agriculture" (CSDG 2). The second target 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 industrialisation and foster innovation".

In addition to the overarching national strategies, several sectoral strategies are relevant for building national research capabilities, as described next.

### Science, Technology, and Innovation

The Ministry of Industry, Science, Technology & Innovation (MISTI) and the National Council of Science, Technology and Innovation (NCSTI) work 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, two main documents drive STI transformation at the national level:

- The National STI Policy 2020-2030

The National STI Policy, approved in 2019, aims to strengthen the national STI capabilities, including institutions and human resources, and improve the STI ecosystem.<sup>14</sup> 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.

- The STI Roadmap 2030

The STI Roadmap 2030, developed by MISTI and enacted in 2021, aims to support the implementation

<sup>13</sup> Government of the Kingdom of Cambodia. Cambodian Sustainable Development Goals Framework (2016-2030). 2018.

<sup>14</sup> Government of the Kingdom of Cambodia. National Policy on Science, Technology and Innovation 2020-2030. 2019

of the National STI Policy.<sup>15</sup> The roadmap is based on five pillars, with one focusing specifically on research. The five pillars include:

- Enhancing the governance of the STI system;
- Build human capital in STI;
- Strengthening research capacity and quality and improving research quality in public and HEIs;
- Increasing collaboration and networking between different actors of the innovation system;
- Fostering an ecosystem for building absorptive capacities in firms and attracting investments in STI.

Moreover, the Roadmap has the development of a national research agenda as one of its objectives and prioritises five scientific and technological domains:

- Agricultural yield increase, produce diversification and agroprocessing;
- Modern production and engineering;
- Health and biomedicine;
- Material science and engineering;
- Services and digital economy, focussing on artificial intelligence and space and spatial technology.

## Education and higher education

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

The Policy on Research Development in the Education Sector 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<sup>16</sup>

MoEYS is implementing the Education Strategic Plan 2019-2023, 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 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<sup>17</sup>

The Policy on Higher Education Vision 2030 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

<sup>15</sup> Government of the Kingdom of Cambodia. Cambodia's Science Technology and Innovation Roadmap 2020-2030. 2021

<sup>16</sup> Cambodia, Ministry of Education, Youth and Sport. *The Education Strategic Plan 2019-2023*. Phnom Penh, 2019.

<sup>17</sup> Cambodia, Ministry of Education, Youth and Sport. *Policy on Higher Education Vision 2030*. Phnom Penh, 2014.

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.

### Information and Communication Technology

- Cambodian Information and Communication Technology Masterplan 2020

The Cambodian Information and Communication Technology (ICT) Masterplan 2020 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.

- Digital Economy and Society Policy Framework 2021-2035

The Government has recently developed a digital policy to address the challenges and opportunities emerging from the Fourth Industrial Revolution and crises such as the COVID-19 pandemic.<sup>18</sup> 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;
- 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.

### Industry

- Industrial Development Policy and Plan 2015-2025

The Cambodia Industrial Development Policy and Plan 2015-2025 is the main policy document focusing on the future of Cambodia's national industry.<sup>19</sup> 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,

<sup>18</sup> Cambodia, Supreme National Economic Council. Cambodia Digital Economy and Society Policy Framework 2021-2035. 2021.

<sup>19</sup> Government of the Kingdom of Cambodia. Cambodia Industrial Development Policy 2015-2025. 2015. pp. 17.

furniture manufacturing, and industrial equipment;

3. Agro-industrial production for export and domestic 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 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.

## Agriculture

- Agricultural Sector Strategic Development Plan 2019-2023

The Plan focuses on different factors to improve agriculture in the future.<sup>20</sup> The objectives relate to productivity, commercialisation 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.

## Climate change

- Cambodia's Climate Change Strategic Plan 2014-2023

While national stakeholders are increasingly interested in sustainable development, they recognise 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. The Plan is structured into three phases: immediate, medium, and long-term, with research being the focus of the third phase (2019-2023).<sup>21</sup>

## Health

- Third Health Strategic Plan 2016-2020<sup>22</sup>

The Ministry of Health (MoH) developed the Third Health Strategic Plan 2016-2020 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.

## Finance

- Law on Investment

The Council for the Development of Cambodia drafted the new investment law in February 2021, and it was promulgated in October 2021.<sup>23</sup> The Law aims to develop a legal framework to enhance domestic and foreign investment based on principles of transparency, predictability, and favourability. It incentivises investment in specific sectors, including high-tech industries conducting R&D and innovation activities. Under this Law, R&D and innovation activities are entitled to investment incentives.

<sup>20</sup> Royal Government of Cambodia. Agricultural Sector Strategic Development Plan 2019-2023. 2020.

<sup>21</sup> Royal Government of Cambodia. Cambodia Climate Change Strategic Plan 2014-2023. 2013.

<sup>22</sup> Department of Planning & Health Information. *The Third Health Strategic Plan 2016-2020*. 2016.

<sup>23</sup> Council for the Development of Cambodia. Draft Law on Investment of the Kingdom of Cambodia. 2021.

## 1.4 CURRENT NATIONAL DEVELOPMENT CHALLENGES FACED BY CAMBODIA

Following the 2019's national voluntary review of the progress made in implementing the 2030 Agenda for Sustainable Development, the Government of Cambodia has prioritised six goals: Education, decent work and growth, reduced inequalities, climate action, peace and institutions, and partnerships for the sustainable development goals. Nonetheless, evaluation of progress can be considered inconclusive due to a lack of data: 38.7 per cent of the goals identified as priorities had insufficient data to make a judgment on whether targets are being met.<sup>24</sup>

Cambridge University's Sustainable Development Report 2021 presents an updated assessment of Cambodia's progress in achieving each of the SDGs.<sup>25</sup> The report shows that, while the country has been making progress, varying level of challenges remain on all goals except on the goals on responsible consumption and production (SDG 12) and climate action (SDG13) which the country has already achieved.

Cambodia has made substantial gains in the last 30 years on its human development index<sup>26</sup>, increasing from 0.368 in 1990 to 0.594 in 2019. Between 1990 and 2019, Cambodia's life expectancy at birth increased by 16.2 years, mean years of schooling increased by 2.3 years, expected years of schooling increased by 4.8 years, and gross national income per capita increased by about 321.4 per cent. However, the country is still ranked 144 out of 189 countries and territories.<sup>27</sup>

### Economy (industry and services)

Cambodia's economy has grown considerably in the last two decades, maintaining an average annual growth rate of 7.7 per cent between 1998 and 2019, making it one of the fastest-growing economies in the world.<sup>28</sup> To maintain this growth and develop the

economy further, the Government is adopting an economic policy mix rooted in growth maximization and structural change, while also promoting sustainability and inclusion. Regarding resilience and self-sufficiency:

"Cambodia aims in the medium term to become largely self-sufficient, and less dependent on donor funding and assistance - with a national economy capable of creating jobs, prosperity and social well-being, and delivering environmentally compatible development. This goal relies on the development of an efficient industrial sector and new higher value-added activities".<sup>29</sup>

The RS-IV highlights the importance of the industry and service sectors to diversify and to increase domestic added value.<sup>30</sup> However, several factors restrict diversification. The development of the ICT industry is limited due to the lack of research culture in ICT, funds, equipment, and skilled human resources.<sup>31</sup> Business growth is limited by two main factors: Large number of informal and non-registered businesses, and limitations regarding human capital.<sup>32</sup> Other factors impacting overall growth include low domestic savings, high household debt, cost pressures due to increasing wages, high interest rates, logistics, transport, and electricity costs.

### Education and skills

Cambodian education has progressed remarkably in recent years, with increases in the completion rate of primary and secondary students from 2015 to 2018. Also, gender parity in the education sector on both lower and upper secondary levels has been achieved in 2018 with enrolment beginning to tilt in favour of girls.<sup>33</sup>

<sup>24</sup> Government of the Kingdom of Cambodia. Cambodia's Voluntary National Review 2019 on the Implementation of the 2030 Agenda for Sustainable Development. 2019. pp. 20-38

<sup>25</sup> Sachs et al., Sustainable Development Report 2021. Cambridge University Press. 2021. pp. 33

<sup>26</sup> The Human Development Index is a composite score incorporating indicators on life expectancy, schooling and income.

<sup>27</sup> United Nations Development Programme. Human Development Report, 2019.

<sup>28</sup> The World Bank. The World Bank in Cambodia. 2022.

<sup>29</sup> Government of Cambodia. Cambodia's Voluntary National Review 2019 of the Implementation of the 2030 Agenda for Sustainable Development. 2019.

<sup>30</sup> Government of Cambodia, Rectangular Strategy for Growth, Employment, Equity and Efficiency: Building the Foundation Toward Realizing the Cambodia Vision 2050. 2018.

<sup>31</sup> Royal University of Phnom Penh. Information and Communication Technology Policy 2017-2020. 2017.

<sup>32</sup> Government of Cambodia. Cambodia's Voluntary National Review 2019 on the Implementation of the 2030 Agenda for Sustainable Development. 2019.

<sup>33</sup> Ibid.



However, to develop the human resources necessary for current and future economic needs, it will be critical to improve equitable and inclusive access to education for children, further reduce drop-out rates as children transition through school levels, enhance the quality of education at all levels and provide more opportunities for life-long learning.

Significant issues remain at the level of high schools and vocational training centres which are vital for industrial development and innovation.<sup>34</sup> Technical and vocational education and training (TVET) institutions face challenges in terms of demand (TVET has low appeal to the general population compared to higher education), and supply (TVET quality is inadequate to respond to the demands of industry, and is poorly connected with other educational streams).<sup>35</sup> In addition, Cambodia has the lowest adult literacy rate of ASEAN countries (82.5 per cent in 2017).<sup>36</sup>

## Health

Cambodia has advanced in the provision of health services, expanding the number of medical facilities and the coverage of the social health protection system. Life expectancy has risen considerably in the last 20 years, from 61.0 years in 2005 to 70.6 years in 2018; however, this is still the third lowest in ASEAN. Moreover, Cambodia needs to improve multiple critical public health indicators such as childhood immunisation and access to safe drinking water, with only 65 per cent of the population having access as of 2018.<sup>37</sup>

According to the RS-IV, the quality of healthcare services remains a challenge in Cambodia as the national healthcare system is ineffective in delivering services, financing, and coverage. The demand for healthcare is changing, and research, human resources, and infrastructure are not evolving at the same rate to meet the demand. Cambodian citizens are still affected by diseases for which there is insufficient research. There is a need for further investment in health infrastructure, including technology and information systems.<sup>38</sup>

COVID-19 has stretched global healthcare capacity in an unprecedented way, and Cambodia implemented a national patient pathway framework, with the inclusion of home-based care to help mitigate the risk of the virus. The framework also suggests repurposing healthcare infrastructure based on the severity of the case and temporarily adding non-medical facilities to compensate for the rise of cases.<sup>39</sup>

## Food, water, agriculture and land

Population growth, urbanisation, and migration are major drawbacks preventing Cambodia from progressing faster on the SDGs related to food and water. Two-thirds of the Cambodian population lives in rural areas, and agriculture remains an essential component of the national GDP (about a quarter). However, productive land is mainly used for rice production, while many vegetables and fruits need to be imported.<sup>40</sup> The diet quality of pregnant women and children under five remains inadequate, and stunting rates are correspondingly high – in 2014, 32 per cent of Cambodian children under five were stunted, with higher rates in rural areas than urban centres. Data shows that Cambodia has successfully increased investment in rural infrastructure, agriculture research, and extension services in line with CSDG Framework targets. However, a lack of data prevents tracking of Cambodia's progress in other areas related to food, such as malnutrition rates, agricultural productivity of small-scale food producers, and sustainable food production. Improving and investing in the agricultural sector would result in more jobs, higher food security, and a reduced income gap between rural and urban areas.

## Environment and sustainability

One major environmental challenge for Cambodia is its susceptibility to climate change. Cambodia is among the most vulnerable countries in the world, affected by unpredictable floods and droughts.<sup>41</sup> The Government has been on track with its target of increasing climate change public expenditure by an average of 1 per cent per year (CSDG 13.2.2), in part due to the implementation of the Cambodia Climate Change Strategic Plan 2014-2023.<sup>42</sup> Moreover,

<sup>34</sup> Government of Cambodia. Rectangular Strategy for Growth, Employment, Equity and Efficiency: Building the Foundation Toward Realizing the Cambodia Vision 2050. 2018.

<sup>35</sup> United Nations Educational, Scientific and Cultural Organization. TVET country profile: Cambodia. 2020.

<sup>36</sup> Association of Southeast Asian Nations ASEAN key figures. 2019.

<sup>37</sup> Ibid.

<sup>38</sup> Government of the Kingdom of Cambodia. Cambodia's Voluntary National Review 2019 on the Implementation of the 2030 Agenda for Sustainable Development. 2019.

<sup>39</sup> World Health Organization. 2021 Annual Report WHO's Response to COVID-19. Geneva. 2022.

<sup>40</sup> Government of the Kingdom of Cambodia. Cambodia's Voluntary National Review 2019 on the Implementation of the 2030 Agenda for Sustainable Development. 2019.

<sup>41</sup> United Nations Development Programme. Cambodia adapts to climate change. 2019.

<sup>42</sup> Government of Cambodia. Cambodia's Voluntary National Review 2019 on the Implementation of the 2030 Agenda for Sustainable Development. 2019.

measures are being taken to increase afforestation to counteract the adverse impacts of rapid industrialisation and urbanisation on the country's natural resources. Nonetheless, more initiatives in

terms of climate change, and environmental and natural resources management will be required to enhance sustainability.<sup>43</sup>

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<sup>43</sup> Government of Cambodia. Rectangular Strategy for Growth, Employment, Equity and Efficiency: Building the Foundation Toward Realizing the Cambodia Vision 2050. 2018.

# CHAPTER

# 2

# ANALYSIS OF THE RESEARCH ECOSYSTEM

The current research system of Cambodia is under-reported, and this report is one of the first attempts to systematically map the existing institutions and qualify their mandate, objectives, and activities.<sup>44</sup> The Cambodian research ecosystem can be illustrated into nine building blocks (see figure 2.1):

The following sections analyse each of these components to provide a detailed portrait of the research ecosystem in Cambodia.

Figure 2.1 Research ecosystem



<sup>44</sup> For another comprehensive study of research in Cambodia see: Cambodian Institute for Cooperation and Peace. (2016). Doing Research in Cambodia: Making Models that Build Capacity.

Available at <https://cicp.org.kh/publications/doing-research-in-cambodia-making-models-that-build-capacity/>

## 2.1 RESEARCH ORGANISATIONS

### Key research organisations in Cambodia

Various types of organisations are producing research in Cambodia. However, there is no standardised categorisation or strategic document outlining the different types of research organisations. The following are the main organisations conducting research in Cambodia:

**Universities and other HEIs:** As of 2018, there were 125 HEIs in Cambodia; 48 public and 77 privates.<sup>45</sup>

Public and private HEIs are usually under the supervision of a thematically relevant ministry, as shown in table 2.1

Universities in Cambodia are distinguished from other HEIs by the fact that it provides multi-disciplinary fields of study from bachelor's degree onward, have a minimum amount of teaching resources (teaching staff and infrastructure), and have three mandatory faculties: (i) Arts, humanities and languages; (ii) mathematics and science; (iii) social science; and at least two other faculties.

**Table 2.1 HEIs (public and private) and the ministries supervising them.**

Ministry or public body	Number of public HEIs that it supervises	Number of private HEIs that it supervises
Ministry of Education, Youth and Sport	13	63
Ministry of Health	2	0
Ministry of Culture and Fine Arts	1	0
Ministry of Agriculture, Forestry and Fishery	3	0
Ministry of Cult and Religion	3	0
Ministry of National Defence	5	0
Ministry of Interior	1	0
Office of the Council of Minister	1	0
Ministry of Public Work and Transport	1	0
National Bank of Cambodia	1	0
Ministry of Social Affairs, Veterans and Youth Rehabilitation	1	0
Ministry of Mine and Energy	1	0
Ministry of Labour and Vocational Training	12	14
Ministry of Post and Telecommunication	1	0
Ministry of Economy and Finance	1	0
Ministry of Land Management, Urban Planning and Construction	1	0

Source: MoEYS (2016)

<sup>45</sup> Ministry of Education, Youth and Sport. Education Congress 2018-2019. The education, youth and sport performance in the academic year 2017-2018 and goals for the academic year 2018-2019. 2019.

## 2.2 RESEARCH TOPICS

### Development challenges to be addressed by research

Directionality for research refers to the setting of focus towards specific topics or interests that are of social or national need and directed towards societal challenges.<sup>46</sup> This ensures that the resources allocated for research are converted to maximize the social impact of public investment. To achieve this, researchers should be incentivized or directed to research topics aligned with national interests. One strategy to direct research at a national level is the development of research missions. Missions are a powerful tool that provides the means to focus research, innovation and investments on solving critical problems. They can enhance Cambodia's capability to harness the power of research and innovation to achieve wider social and economic goals.<sup>47</sup> This presents an overview of the overlapping priorities of national interest based on the CSDGs Framework and other key national policies and strategies. Based on table 2.2, education, sustainable industrialisation and innovation, gender equality, sustainable water management, and tackling climate change are topics of high strategic importance to Cambodia. Moreover, the ESCAP survey also asked stakeholders what development challenges need to be urgently addressed by research in Cambodia: Climate change was the most cited challenge, followed by economic recovery from COVID-19. Such considerations should be built upon to create a series of concrete missions for Cambodia that would guide researchers in selecting research topics.

### Research topics to address development challenges

According to the ESCAP survey respondents, the topics being researched currently in Cambodia only partially respond to the problems faced by the nation. Agricultural research, for example, can address the problem of climate change, allowing for more sustainable products and practices. However, climate

change is a significant challenge for Cambodia, and respondents noted that more research is still needed to support products and practices that are cleaner, safer, sustainable, and competitive.

As shown in table 2.2, the most voted-for research topics among ESCAP survey respondents were "agriculture, forestry, and fisheries", "electrical and mechanical engineering", "basic medical research", and "environmental engineering".

Notably, the current topics highlighted by government officials from line ministries (figure 2.2) as the most important for them are different from the topics currently researched by the universities/research institutes and the private sector. Government officials reported that the most important topics in their mission are "economics and business", followed by "agriculture, forestry, and fisheries". However, regarding the future challenges for 2025, there is an agreement among all types of stakeholders on "agriculture, forestry and fisheries".

### Topics being taught at Cambodian higher education institutions

Higher education curricula must be aligned with the strategic research topics to ensure that research capacity is developed in critical areas for Cambodia. Currently, it has been argued that the curricula of Cambodian HEIs are overly influenced by private commercial interests and international investors<sup>48</sup> rather than broader national interests such as economic diversification and the development of a skilled labour force. There is a mismatch between the skills and knowledge created by HEIs and the skills demanded by employers and the market more generally.<sup>49</sup> Cambodia lacks qualified professionals in fields such as agriculture, mathematics, and science - in 2017-2018 just 3 per cent of undergraduate students were studying agriculture, and 27 per cent were studying STEM subjects, while 42 per cent were studying business. It should be noted that the number of students enrolled in STEM subjects is on an upward trend, up from 18 per cent in 2012-2013; however, it is still below the market needs.<sup>50</sup>

<sup>46</sup> United Nations Economic and Social Commission for Asia and the Pacific. *Frontiers of Inclusive Innovation: Formulating Technology and Innovative Policies that Leave No One Behind*. 2021.

<sup>47</sup> Mazzucato. *Mission-oriented research and innovation in the European Union*. 2018.

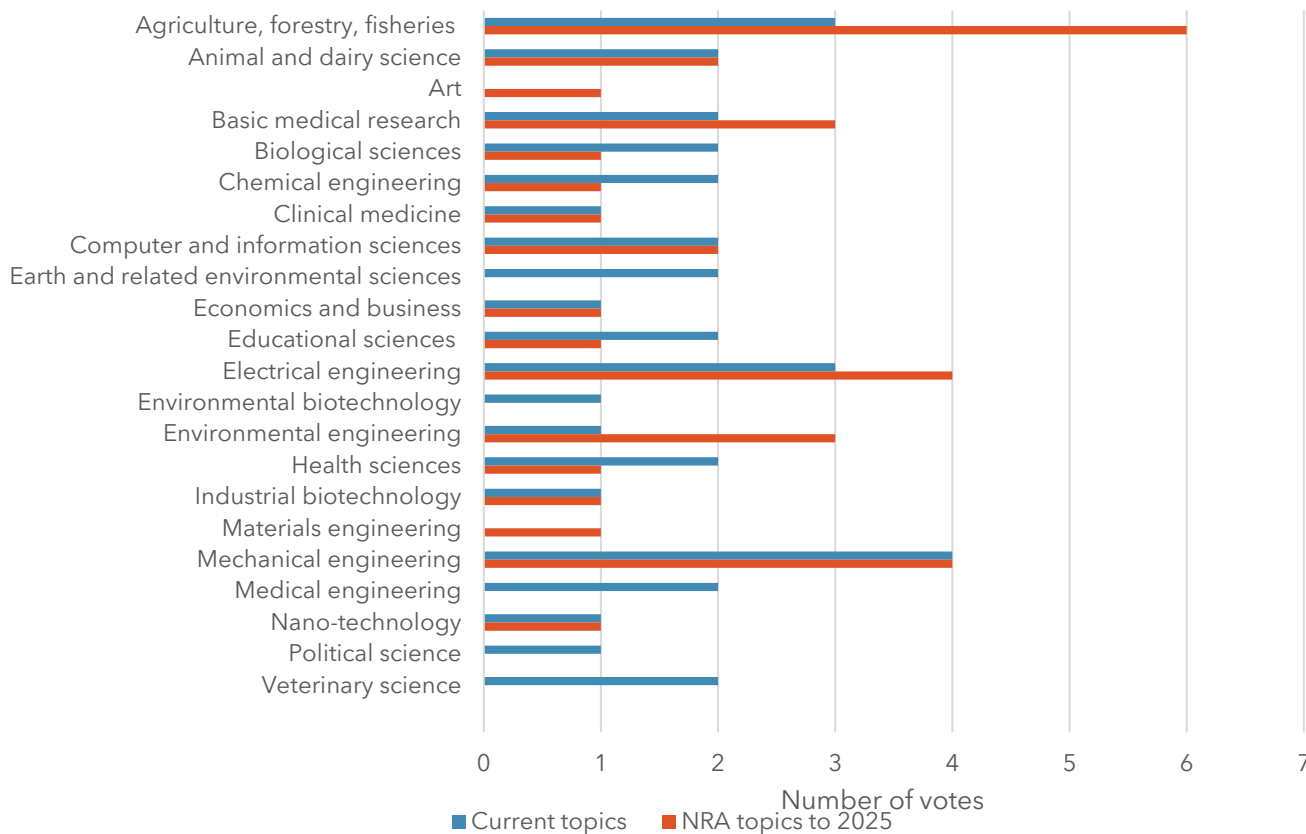
<sup>48</sup> International Institute for Asian Studies. *The politics of higher education in Cambodia*. 2017.

<sup>49</sup> Madhur. *Cambodia's skill gap: An anatomy of issues and policy options*. 2014.

<sup>50</sup> Ministry of Education, Youth and Sport. *Education Congress*. 2019.

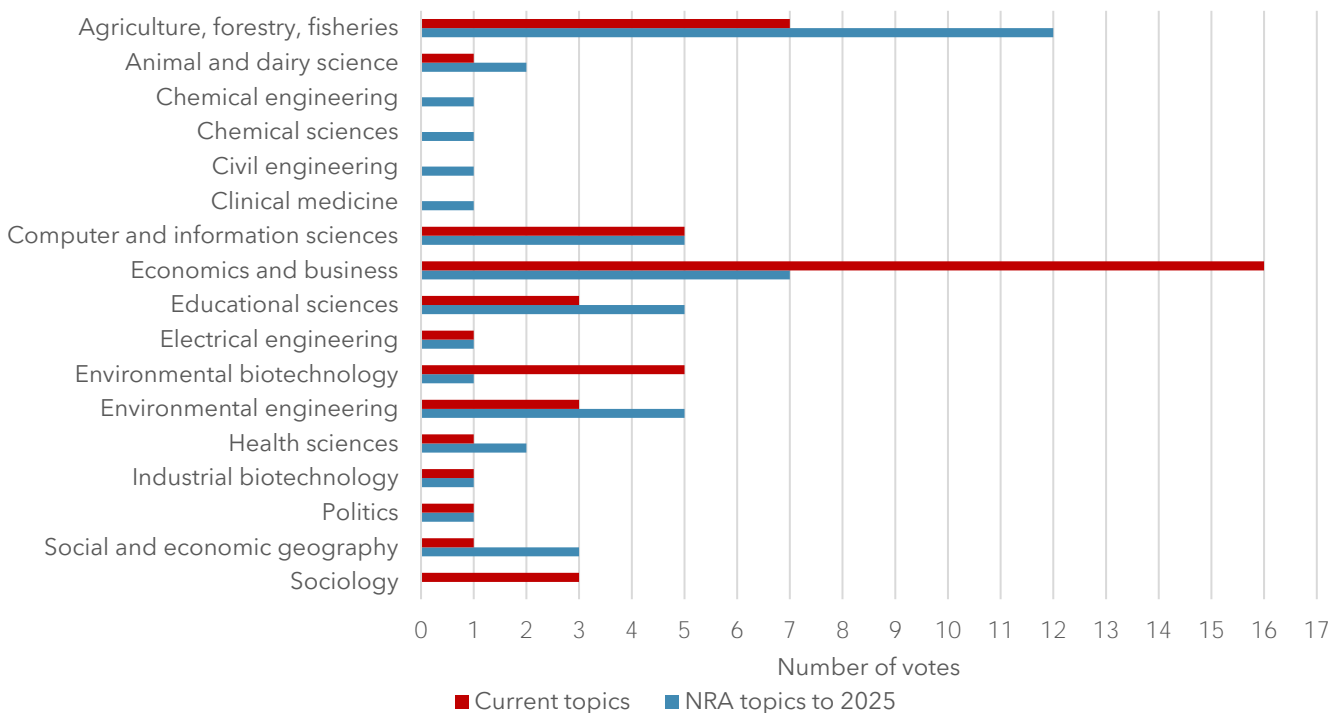


**Figure 2.2 Current most researched topics in Cambodia and research topics that should be a priority of the NRA 2025 according to universities and research institutes.**



Source: ESCAP Survey

**Figure 2.3 Current most researched topics in Cambodia and research topics that should be a priority of the NRA 2025 according to line ministries**



Source: Scopus

**Table 2.2 National strategies in which the developed priorities are in line with a CSDG. Source: based on Cambodian national policy documents**

Cambodian Sustainable Development Goals	Rectangular Strategy Phase IV	National Strategic Development Plan 2019-2023	National Policy on Science Technology and Innovation 2020-2030	Cambodia Industrial Development Policy 2015 - 2025	Cambodian ICT Masterplan 2020	Education Strategic Plan 2019-2023	Development of the National Productivity Master Plan for Cambodia 2020-2030
Goal 1: End poverty in all its forms everywhere		X					
Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	X	X					
Goal 3: Ensure healthy lives and promote well-being for all at all ages	X	X					
Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	X	X	X	X	X	X	X
Goal 5: Achieve gender equality and empower all women and girls	X	X	X			X	
Goal 6: Ensure availability and sustainable management of water and sanitation for all	X	X		X		X	
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all	X	X		X			
Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all		X				X	X
Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	X	X	X	X	X	X	X
Goal 10: Reduce inequality within and among countries							
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable							
Goal 12: Ensure sustainable consumption and production patterns		X	X		X		

**Table 2.2 National strategies in which the developed priorities are in line with a CSDG. Source: based on Cambodian national policy documents**

Cambodian Sustainable Development Goals	Rectangular Strategy Phase IV	National Strategic Development Plan 2019-2023	National Policy on Science Technology and Innovation 2020-2030	Cambodia Industrial Development Policy 2015 - 2025	Cambodian ICT Masterplan 2020	Education Strategic Plan 2019-2023	Development of the National Productivity Master Plan for Cambodia 2020-2030
Goal 13: Take urgent action to combat climate change and its impacts		X	X	X	X		
Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development		X					
Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss		X					
Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels		X					
Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development				X			
Goal 18: End the negative impact of Mine/ERW and promote victim assistance							

Source: based on Cambodian national policy document

## 2.3 RESEARCHERS

### Research staff

In 2015, there were only 30 full-time equivalent (FTE) researchers in R&D per million inhabitants in

Cambodia (see table 2.3).<sup>51</sup> This translated into less than 500 FTE researchers in the country, which hinders the development of national research capabilities.

**Table 2.3 Number of researchers per million inhabitants by ASEAN countries**

Country	Year of most recent data	Number of researchers (FTE) per million inhabitants
Brunei	N/A	No data
Cambodia	2015	30
Indonesia	2018	216
Lao PDR	N/A	No data
Malaysia	2016	2397
Myanmar	2017	29
Philippines	2016	106
Singapore	2017	6083
Thailand	2018	1350
Vietnam	2018	708

Source: UNESCO Science Report

Employment in academia is not considered attractive due to heavy workload, low salary, lack of professional development opportunities, and lack of recognition among other things.<sup>52</sup> On the other hand, there are only a few positions for researchers in non-academic positions. In 2015, 4.3 per cent of researchers worked for the private sector, 49.4 per cent in governmental institutions, 8.5 per cent in private non-profit organisations and 37.7 per cent in higher education.<sup>53</sup>

A low percentage of university teaching staff in Cambodia hold PhD degrees. Data from academic year 2015-2016 shows that only 3 per cent of university teaching staff held a PhD degree, and 59 per cent held a Master's degree (41 per cent had a local degree and 18 per cent had an overseas degree).<sup>54</sup> Cambodian

higher education instructors are less likely to hold a PhD and more likely to hold a Master's degree than instructors in other ASEAN countries, as shown in table 2.4.

Women are also under-represented among research staff. Data from 2015 reveals that just 23.7 per cent of research staff are women, which is comparable to countries in the region.<sup>55</sup> According to the ESCAP survey, respondents reported varying levels of female representation among research staff, from 0 per cent (NPIC) to 50 per cent (AVI and CRDI) of research staff.

The lack of professionals with advanced degrees is consistent with the ESCAP survey results and has severe implications for the quality of research and the ability to transfer research skills to students. According

<sup>51</sup> United Nations Educational, Scientific and Cultural Organization, UNESCO Institute for Statistics. 2021.

<sup>52</sup> Ros. V., Olksiyenko. A. Policy Misalignments and Development Challenges in the Cambodian Academic Profession : Insights from Public University Lecturers. 2018.

<sup>53</sup> United Nations Educational, Scientific and Cultural Organization. UNESCO Science Report. 2021.

<sup>54</sup> Ministry of Education, Youth and Sport. 2016.

<sup>55</sup> United Nations Educational, Scientific and Cultural Organization. Fact Sheet 60 Women in Science. 2020.

to the ESCAP survey, the percentage of staff holding a PhD degree ranged from 0 per cent at the National Polytechnic Institute of Cambodia (NPIC) to 25 per cent at the Institute of Technology of Cambodia (ITC) and CDRI. Moreover, the university staff has a heavy teaching workload. Salaries are considered very low (around 300 USD per month as of 2017)<sup>56</sup> pushing staff to take extra teaching roles outside their home institutions. The additional work hours leave them little

time for research, which is one of the main reasons university staff have a low research output. Most survey respondents reported having between zero per cent and 20 per cent of their time dedicated to research. However, respondents from research institutes and think tanks reported much higher time dedicated to research: 50 per cent at the Asian Vision Institute and 90 per cent at the CDRI.

**Table 2.4 Higher education instructors with a master’s or doctoral degree, ASEAN countries, most recent data (Percentage)**

Country	Year of most recent data	PhD	Master’s degree
Cambodia	2016	3	59
Philippines	2012	13	41
Vietnam	2012	14	46

Source: Cambodia: MoEYS; Philippines: Commission on Higher Education; Vietnam: Ministry of Education and Training.

A 2016 study showed that public university staff had more time to devote to research (12.44 hours per week during term time) than private university staff (10.05 hours per week during term time) because private university staff devotes more time to teaching. Furthermore, staff from public universities in the provinces had the least time for research (9.85 hours per week during term time) because they devoted more time to administrative tasks.<sup>57</sup> Faculty who are full-time staff members and with terminal degrees obtained abroad are more involved in research activities. The same study found that 65 per cent of respondents (444 university lecturers across ten universities) had not engaged in any research activities at all in the last five years.<sup>58</sup>

While significant structural changes would be needed to allow university staff sufficient time to conduct quality research, a positive trend towards more value being placed on research can be seen in some universities. Half of ESCAP survey respondents stated that time spent on research had increased over the last three years (the remainder said it had not changed). In addition, half of the respondents stated that they intended to hire more research staff in the next three years.

### Doctoral students

Several factors hinder the training of doctoral staff. As mentioned in section 1.2, the Khmer Rouge was

responsible for the loss of a generation of intellectuals and researchers that could now be mentoring young doctoral students. Moreover, due to the low levels of PhD holders among university staff, very few researchers have the necessary expertise to build research capacity in doctoral students. According to the MoEYS data, there were only 1349 enrolled PhD students in the academic year 2017-2018, albeit already increased from 1181 total enrolled PhD students from academic year 2013-2014. Consistent with this, among the university and research institute stakeholders who responded to the ESCAP survey, half had no PhD students at their institution. Even the Royal University of Phnom Penh (RUPP), the country’s largest university with around 20,000 students, only reported having 20 doctoral students.<sup>59</sup> Women students are well represented at the undergraduate level, with data from 2017-2018 showing 49.7 per cent of students pursuing a bachelor’s degree are women; the increase can be explained, at least partly, because MoEYS has prioritised female students in the scholarship programme. However, the percentage of female master’s students is 22 per cent, and doctoral students averaged only 5 per cent. Only 15 students graduated with a doctoral degree in 2017-2018 (2 of whom were women).<sup>60</sup>

<sup>56</sup> As reported in The International Institute for Asian Studies. 2017.

<sup>57</sup> Kitamura, Y. et al.. Quality of Education and Research in Cambodian Higher Education Institutions. 2016.

<sup>58</sup> Eam, P. Factors Differentiating Research Involvement among Faculty Members: A Perspective from Cambodia. 2015.

<sup>59</sup> ESCAP Survey.

<sup>60</sup> Ministry of Education, Youth and Sport. Education Congress 2018-2019. The education, youth and sport performance in the academic year 2017-2018 and goals for the academic year 2018-2019. 2019. pg. 66-69.

## 2.4 RESEARCH FUNDING

### Research funding in universities and research institutes

Research in Cambodia is under-funded. As shown in table 2.5, gross domestic expenditure on R&D (GERD) was just 0.12 per cent of GDP in 2015, making it the second-lowest in the region after Myanmar.

Regarding financial support for research, figure 2.4 indicates that 35 per cent of the funding comes from abroad (the highest proportion in the ASEAN countries), 25 per cent from the government (second-lowest among the ASEAN countries), 22 per cent from private non-profit organisations and the remaining 19 per cent from businesses.<sup>61</sup>

**Table 2.5 Gross domestic expenditure on R&D (GERD), ASEAN countries, most recent year (Percentage of GDP)**

Country	Year	GERD
Brunei	2018	0.28
Cambodia	2015	0.12
Malaysia	2016	1.44
Myanmar	2017	0.03
Philippines	2015	0.16
Singapore	2017	1.94
Thailand	2017	1.00
Vietnam	2017	0.53

Source: UNESCO Science Report

Foreign donors and multilateral development banks, such as the World Bank and Asian Development Bank, are vital sponsors of R&D in Cambodia. The primary recipients of funds are the Cambodian Agricultural Research and Development Institute of the Ministry of Agriculture, Forestry and Fisheries.<sup>62</sup> The ESCAP survey identified similar patterns of funding. Although there was much variation in the primary funding sources, the most cited source was international organisations and development funds (the primary source of funding for three institutions), and the least cited was business and business organisations (minor source for three institutions). Given that a substantial amount of funding comes from foreign partners and international organisations, it significantly impacts the research topics funded, and the research timeframes are often short-term.<sup>63</sup>

The monetary amount of research funding received from public sources (i.e., ministries) in 2020 varied from 0 (AVI and UHS) to 4.9 billion KHR at ITC (see table 2.6). Regarding private sources, RUA and UHS received 0, AVI and NPIC received 20 million KHR each, RUPP received 4 billion KHR (the same amount they received from public sources), and CDRI received 4.8 billion KHR.

Several funding mechanisms are used in Cambodia: Block grant mechanisms at the Royal University of Agriculture, competitive calls at CDRI, and a combination of both at ITC. Other sources of funding include an annual budget plan (NPIC), Higher Education Improvement Project (RUPP)<sup>64</sup>, and funding via data collection or publications (UHS).

<sup>61</sup> United Nations Educational, Scientific and Cultural Organization. Science Report. 2021.

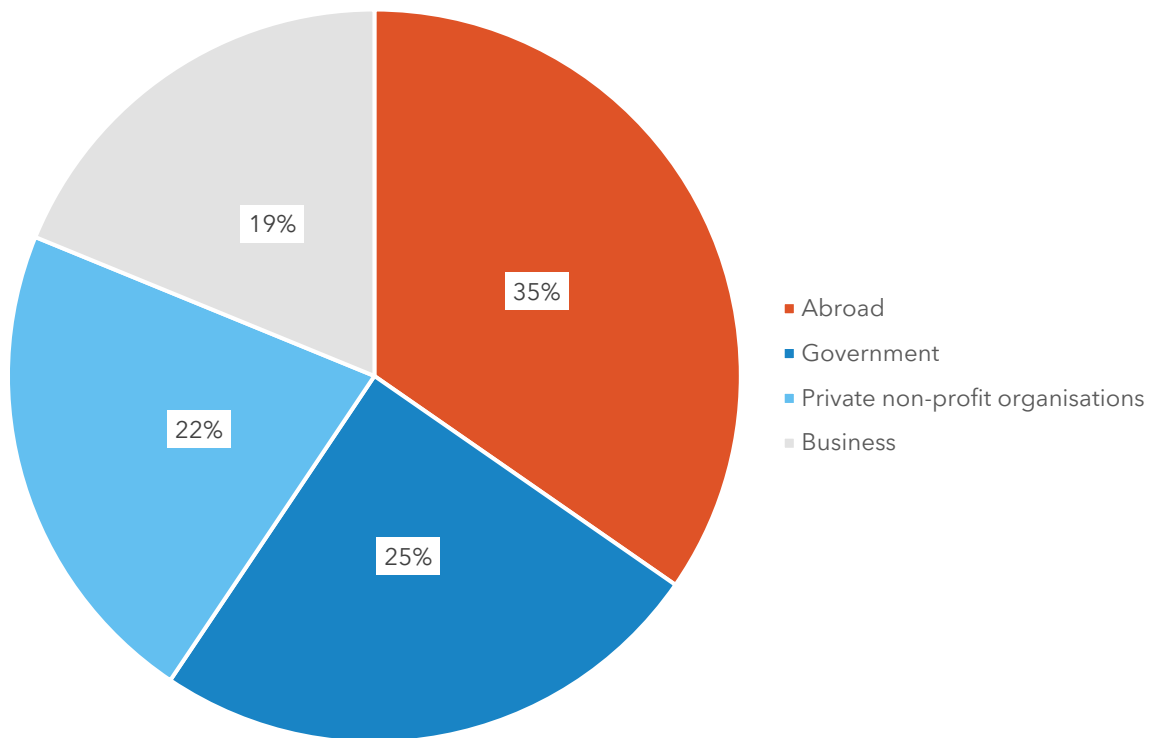
<sup>62</sup> Ibid.

<sup>63</sup> Cambodian Institute for Cooperation and Peace. Doing Research in Cambodia: Making Models that Build Capacity. 2016.

<sup>64</sup> The objective of HEIP is to improve the quality and relevance of higher education and research mainly in STEM and agriculture at targeted HEIs, and to improve governance in the sector.



**Figure 2.4 Expenditure on R&D, by source, Cambodia, 2015**  
**Percentage of total R&D expenditure**



Source: UNESCO Science Report

In 2010, the Government adopted the Policy on Research Development in the Education Sector, followed in 2011 by the Master Plan for Research Development in the Education Sector. However, these policies and plans were not matched with funding.<sup>65</sup> Moreover, the funding system for research is overly complex, and research staff often do not know how to access available research funding. As a result, students and faculty frequently fund their own research.<sup>66</sup>

- According to the ESCAP survey, the main difficulties researchers face in raising funds for research in their university or research institute are:
- Lack of information on funding sources
- Limited funding
- Excessive competition (especially from international research institutes)

Lack of time (given their low salaries, researchers often take on extra teaching, leaving them with insufficient time to apply for research funds)

The government could:

- Increase the amount of research funding relative to GDP
- Open more funding sources for competitive calls
- Set up a research fund committee
- Make an annual declaration of research topics and funds
- Ensure transparency in research grant management
- Ensure researchers have more time to dedicate to research
- Incentivise the private sector to fund research

<sup>65</sup> Un, L. & Sok, S. Reason that this influence from the former Soviet Bloc explains why the Cambodian higher education is more oriented towards teaching and learning than producing research. 2014.

<sup>66</sup> Cambodian Institute for Cooperation and Peace. Doing Research in Cambodia: Making Models that Build Capacity. 2016.

To enhance research funding, respondents suggested MoEYS announced in August 2020 the establishment of the Research Creativity and Innovation (RCI) Fund. The RCI Fund will finance research proposals that seek tangible results, can be implemented immediately, and resolve challenges related to promoting industrial development in Cambodia. The RCI Fund will provide financial support for three priority topics:

- Digitalisation for the Industrial Revolution 4.0 (digital education, digital economy, and digital application)

- Applied agricultural research
- 21st-century pedagogy research (virtual classrooms, educational response to COVID-19, small research grants for students, RCI award)

Furthermore, in July 2021, the National Council of Science, Technology and Innovation met for the first time and set a target of reaching research spending of at least 1 per cent of GDP by 2030, in order to strengthen the nation's research capacity and research quality. The Council also aims to have half of the R&D expenditures financed by the private sector by 2030.<sup>67</sup>

**Table 2.6 Funding from public and private sources, research organisations consulted in the ESCAP survey, 2020 (Million KHR)**

Institution	Public sources (ministries)	Private sources
Royal University of Agriculture	360	0
Asian Vision Institute	0	20
National Polytechnic Institute of Cambodia	80	20
Royal University of Phnom Penh	4000	4000
University of Health Sciences	0	0
Institute of Technology of Cambodia	4950	80
Cambodia Development Research Institute	600	4800

Source: ESCAP survey

### Private sector expenditure on R&D

Currently, private sector spending on R&D is very low; Cambodia's GERD (Table 2.5) is 0.12 per cent of GDP, and the proportion of that coming from business is 19 per cent, one of the lowest among ASEAN countries. Also, R&D in Cambodian businesses is rare. Among the four private sector organisations that responded to ESCAP survey, two had no R&D budget, one organisation spent 50,000 KHR in 2020 on R&D from its own resources, and another organisation spent 200,000 KHR from its own resources. Only one organisation received R&D funding from the

government (channelled through a block grant mechanism). Otherwise, external R&D funding came from international donors and NGOs. Increasing the research funded by businesses from 19 per cent to 50 per cent is an ambitious goal. Regarding the main difficulties faced in raising research funds, ESCAP survey respondents from the private sector and universities/research institutes highlighted that there is insufficient funding, that procedures are complicated, and that limited guidance is provided. They suggested that a set of clear guidelines and the possibility of applying online for funding programmes would simplify the process.

<sup>67</sup> Government of the Kingdom of Cambodia. (2021). Cambodia's Science, Technology and Innovation Roadmap 2020-2030.

## 2.5 RESEARCH QUALITY AND PERFORMANCE

### Research outputs

In 2019, there were 27 scientific publications in internationally recognised journals per million inhabitants in Cambodia,<sup>68</sup> making Cambodia the second-lowest rate of publications per inhabitant in ASEAN, as shown in table 2.7.

The main disciplines covered by published papers include health sciences (43 per cent), environmental sciences (11 per cent), and cross-cutting strategic technologies and engineering (both 8 per cent).<sup>69</sup>

Research output in the form of scientific articles in Cambodia comes mostly from universities and public research institutes. This production is dynamic and is following an upward trend (albeit from a small base),

from little to no publications before the year 2000 to nearly 600 publications a year currently (figure 2.5). The most research-active organisations in terms of output are shown in figure 2.6. Cambodia is highly connected to (and reliant on) international research collaboration. Between 2008 and 2013, 96 per cent of Cambodian articles involved at least one international co-author, which may explain the increasing citation rate. Cambodians count both Asian (Thailand and Japan) and Western scientists (United States, United Kingdom and France) among their closest collaborators. The most productive research areas in Cambodia for the period 2000-2020 are shown in figure 2.7, with research in the medical field producing the most significant output.

**Table 2.7 Scientific publications, ASEAN countries, 2019 Number of publications in internationally recognised journals, per million inhabitants**

Country	Scientific publications per million inhabitants
Brunei	1041
Cambodia	27
Indonesia	139
Lao PDR	42
Malaysia	944
Myanmar	12
Philippines	38
Singapore	3349
Thailand	247
Vietnam	113

Source: UNESCO Science Report 2021

### Quality of research

Cambodia faces several challenges in ensuring research quality. Some have already been discussed, such as a lack of time and funding for research, sub-optimal infrastructure (including access to online journals and databases) and limited training of doctoral students. Data quality and ethics are other factors hindering research quality in Cambodia. Ensuring that

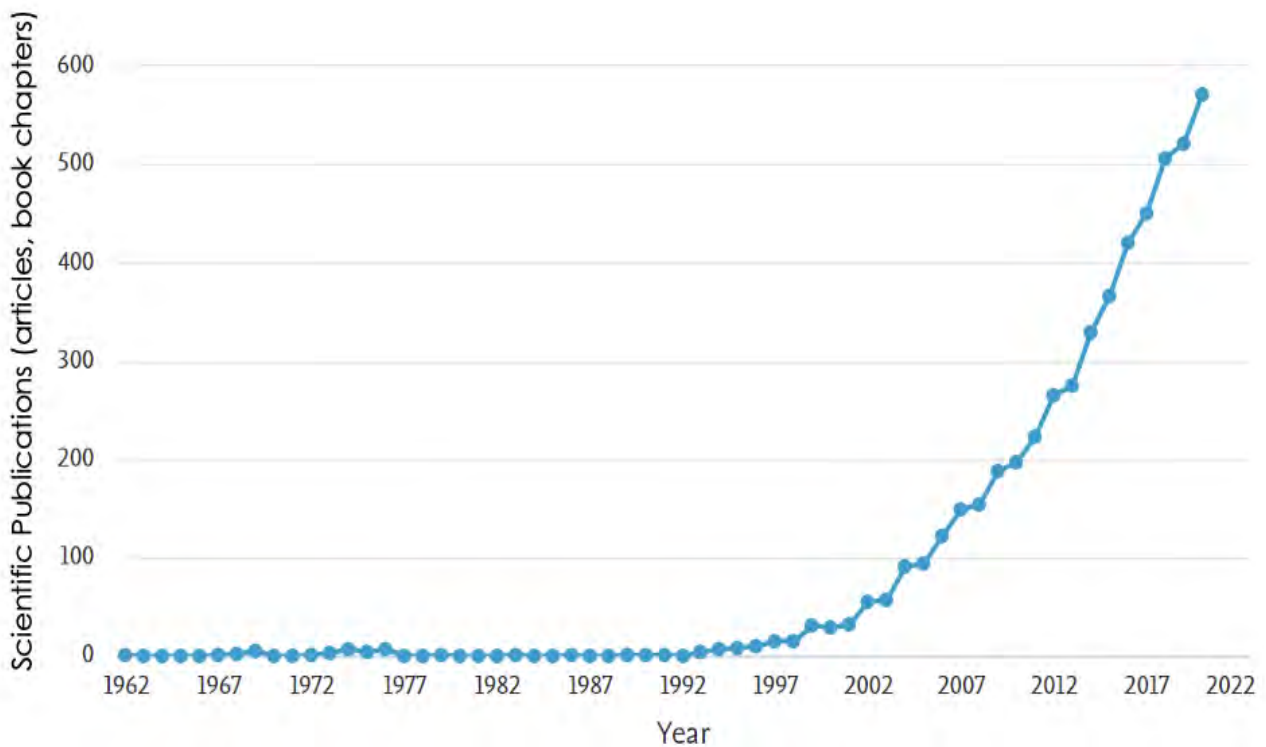
research data is of high quality and collected in a way that adheres to ethical guidelines is essential to publishing in most international peer-reviewed journals. However, a 2016 study suggests that institutional attention to data quality is weak at the HEI level.<sup>70</sup> Furthermore, only half of the respondents of ESCAP survey were aware of the existence of a national code of research ethics, and only one (AVI) was aware of a code of ethics at the institutional level.

<sup>68</sup> United Nations Educational, Scientific and Cultural Organization. Science Report. 2021.

<sup>69</sup> *ibid.*

<sup>70</sup> Cambodian Institute for Cooperation and Peace. Doing Research in Cambodia: Making Models that Build Capacity. 2016.

**Figure 2.5 Scientific publications (articles, book chapters) with authors or co-authors with a Cambodian affiliation, 1962 to present.**



Source: Scopus

Language barriers also hinder research quality in Cambodia (as in other countries). While most programmes in Cambodian universities are taught in Khmer, researchers who cannot read and write in English professionally face difficulties consulting scientific publications, publishing, and obtaining funding. Moreover, the issue is exacerbated by the overreliance on international donors, as they usually require project proposals and published work to be written in English in order to receive funding.<sup>71</sup>

## Evaluation of researchers and research institutions

Cambodia seems to be following the global trend of increasing autonomy for HEIs in return for increased accountability. In 2003, the Government set up the Accreditation Committee of Cambodia, a national higher education quality and assessment body. Cambodia also began granting more autonomy to universities in the form of the PAI status in 1997.

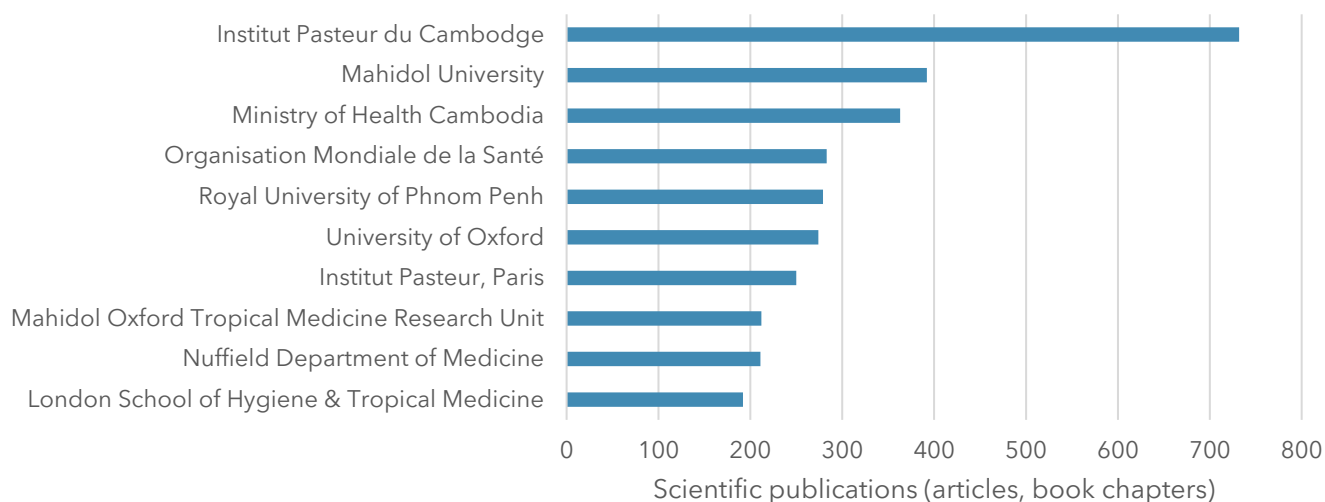
According to the ESCAP survey, the most important research performance criterion for university

stakeholders is relevance to matters of national importance. When asked what factors predicted career progression, there was little consensus; current methods of evaluating research performance were perceived as only somewhat effective and somewhat fair, suggesting a lack of support for current evaluation methods. To improve these methods, respondents mainly wanted more clarity on guidelines, key performance indicators (KPIs), and assessment criteria.

In August 2021, the MoEYS announced the implementation of professorial rankings across all national HEIs. Currently, all university teachers in Cambodia are known as lecturers (which can be categorized between 'lecturer' or 'senior lecturer' depending on age and seniority) and are provided with a similar basic salary. MoEYS suggested the introduction of three academic titles: Assistant professor, associate professor and (full) professor, with rankings depending on number of scientific publications. Those publication requirements will provide incentives for Cambodian academics to conduct and publish more academic research.

<sup>71</sup> Cambodian Institute for Cooperation and Peace. Doing Research in Cambodia: Making Models that Build Capacity. 2016.

**Figure 2.6 Top 10 most productive research institutions with a Cambodian affiliation, 2000-2020**



Source: Scopus

## 2.6 RESEARCHER MOBILITY AND INTERNATIONAL COLLABORATION

### Existing researcher mobility and international collaborations

As described above, Cambodian researchers collaborate with other international authors in their publications, often with researchers from Thailand, Japan, United States, United Kingdom and France. ASEAN also plays a role in fostering Cambodia's international research collaborations. For example, the ASEAN Plan of Action on Science, Technology and Innovation 2016-2025 proposes student exchanges and university twinning programmes with top education institutions in ASEAN countries.

A balance between local and international research is essential to ensure a sustainable research system. Brain circulation refers to "the possibility for developing countries to draw on the skills, know-how and other forms of experience gained by their migrants - whether they have returned to their country of origin or not - and members of their diaspora".<sup>72</sup> Brain circulation enhances innovation as it increases the involvement of institutions in different networks that bring in new

knowledge, approaches and ideas. Moreover, considering Cambodia's lack of experienced researchers, attracting foreign researchers would benefit the entire ecosystem as they bring new skills and can act as mentors for young researchers.<sup>73</sup> Quality

of research increases with mobility since results are shared among a broader community, thus increasing the probability of detecting solutions for specific problems.<sup>74</sup>

### Barriers to mobility and international cooperation

According to government officials' response to the ESCAP survey, there is no national scheme to support researchers' short-term and medium-term international mobility. Moreover, it is difficult to repatriate researchers to Cambodia when they have conducted research or studied abroad.<sup>75</sup> Some of the barriers that discourage Cambodian researchers from staying in the R&D sector in Cambodia, and foreign researchers from going to Cambodia include:<sup>76, 77</sup>

<sup>72</sup> European Commission. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Migration and Development: Some Concrete Orientations. 2005.

<sup>73</sup> Cambodian Institute for Cooperation and Peace. Doing Research in Cambodia: Making Models that Build Capacity. 2016.

<sup>74</sup> Asia-Pacific Economic Cooperation. Researcher Mobility Workshop Report. 2015.

<sup>75</sup> ESCAP survey.

<sup>76</sup> Asia-Pacific Economic Cooperation. Researcher Mobility Workshop Report. 2015.

<sup>77</sup> Cambodian Institute for Cooperation and Peace, Doing Research in Cambodia: Making Models that Build Capacity. 2016.

- Lack of knowledge regarding mobility opportunities
- Language barrier in daily life and academia
- Lack of recognition and clear career paths
- Salary differences across countries, job security, taxes and visas
- Lack of funding for international collaborations
- High competition among Cambodian researchers, resulting in researchers having less time to spend on collaborative projects
- Lack of policy support, making a career in research less attractive
- Lack of trust towards other collaborators due to Khmer culture and historical legacy of civil war
- Lack of time for travelling to meet potential collaborators

These barriers limit mobility and collaboration and have an impact on the development of the research system in Cambodia and on the quality of research.

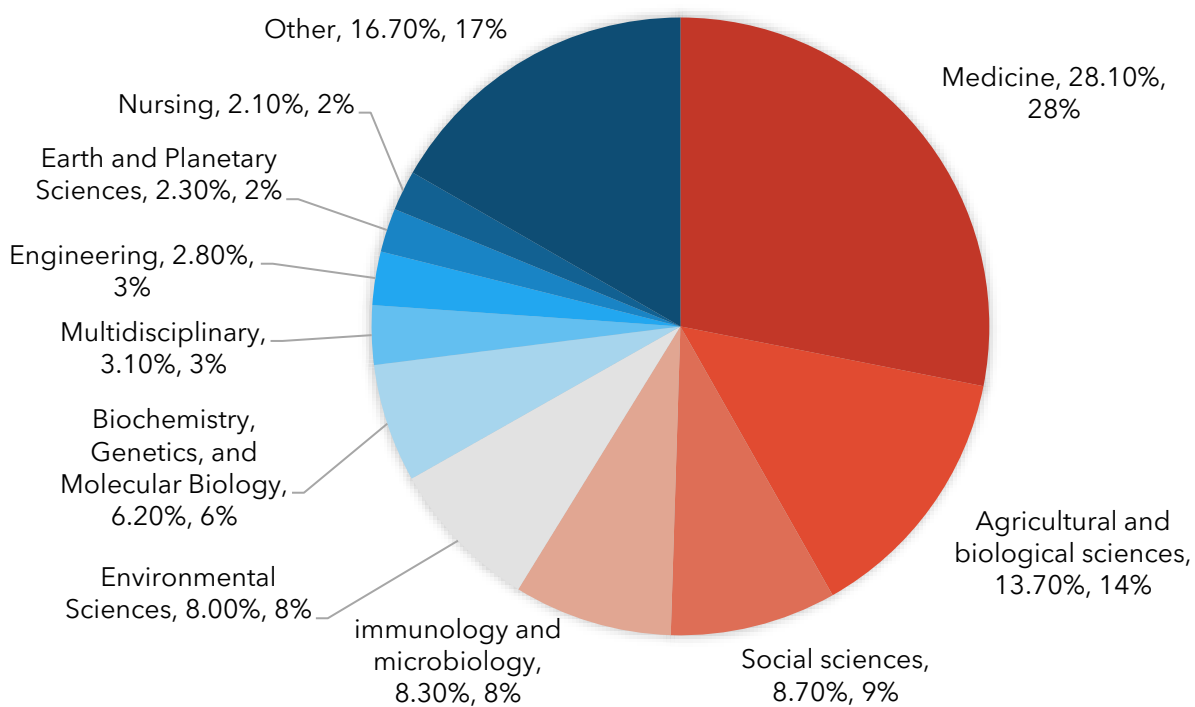
### Potential solutions

To expand international research collaboration, respondents to ESCAP survey suggested the following:<sup>78</sup>

- Promote strong university networks with strong research collaboration
- Create a supportive environment for visiting researchers
- Ease regulations for working permits
- Support research mentorship
- Increase researcher mobility schemes/mid-career transition schemes.

In summary, there is not much support for international research collaboration, and there is a lack of clarity on what little is available.

**Figure 2.7 Top 10 most productive research areas in Cambodia, 2000-2020**



Source: Scopus

<sup>78</sup> ESCAP survey.



## 2.7 ACADEMIA-INDUSTRY COLLABORATION

Research and innovation are closely related; research supports innovation activities, which, in turn, support the realisation of research outputs. Additionally, the commercialisation of innovation provides opportunities for funding further research. In an efficient system, research institutions and innovators work closely to generate relevant knowledge and address current needs. To support economic development, research needs to be leveraged through academia-industry collaborations.<sup>79</sup>

Support for academia-industry collaboration can include promoting incubators, accelerators, technological platforms open to the industry, and innovation clusters. Furthermore, collaboration can also happen at the educational level by involving the private sector in TVET programmes.<sup>80</sup>

### Extent of collaboration

While business studies are highly popular in Cambodian HEIs, practical entrepreneurship-related initiatives are more recent. Industry linkage offices, incubators and start-up centres have been recently developed in selected national universities such as the Royal University of Phnom Penh, the National University of Management, the Institute of Technology Cambodia, and the National Institute of Posts, Telecommunications and ICT. Other universities have established laboratories that foster entrepreneurial activities and raise awareness of entrepreneurial opportunities. Specific initiatives such as business competitions, start-up simulators for students, start-up bootcamps and coworking spaces have been developed in the National University of Management, ITC, Norton University, NIPTICT and the University of Puthisastra. Furthermore, other projects aim to improve STEM and TVET programmes to enhance academia-industry collaboration.<sup>81</sup>

According to survey respondents, support for industry collaboration exists in most universities and research institutes in Cambodia (e.g., dedicated industry collaboration units), but collaboration is still limited. Exchanges with the private sector are usually restricted to one-off events (field trips, career days, training), seminars and conferences, social media, industry collaboration units, existing networks and alumni, and the university website.<sup>82</sup>

### Current framework

The Government is seeking to facilitate academia-industry collaboration by introducing several policies and incentives. Some incentives include technical support, R&D and capacity-building funds, and tax exemptions for HEIs. However, ESCAP survey respondents from universities and research institutes reported that, despite the existence of facilities such as university-industry linkage offices and efforts to communicate research results to the private sector (via networking, events, etc.), there are still not enough incentives for researchers to collaborate with industry. Only some ministries – Ministry of Foreign Affairs and International Cooperation (MFAIC), Ministry of Economy and Finance (MEF), Ministry of Commerce (MoC), and Ministry of Post and Telecommunication (MPTC) – reported providing incentives for academia-industry collaboration.<sup>83</sup> A lack of financial support and other resources hinders the establishment of further collaboration incentives.

### Further developments needed

The first step to improving academia-industry collaboration is to involve both the private sector and academia in defining a national research agenda which ensures that their interests are aligned, and opportunities for collaboration can arise.<sup>84</sup>

Cambodia's Science, Technology & Innovation Roadmap 2030 has set targets to foster academia-industry collaboration. There are targets regarding the number of university-business collaboration offices, integrating internships in the curricula of HEIs, increasing linkages through clusters and technology and innovation parks, and building vocational education and training programmes together with the private sector.<sup>85</sup>

Respondents from universities and research institutes made the following suggestions regarding incentives for collaborating with the private sector:

- Develop policy and guidelines on consultancy work for public sector researchers (as civil servants, they are not currently permitted to do consultancy work)
- Allocate seed funds for collaborative research with the private sector

<sup>79</sup> Asia-Pacific Economic Cooperation. Researcher Mobility Workshop Report. 2015.

<sup>80</sup> United Nations Economic and Social Commission for Asia and the Pacific. The Science, Technology and Innovation Ecosystem of Cambodia. 2021.

<sup>81</sup> Ibid.

<sup>82</sup> ESCAP survey.

<sup>83</sup> ESCAP survey.

<sup>84</sup> Government of the Kingdom of Cambodia. Cambodia's Science, Technology and Innovation Roadmap 2020-2030. 2021b.

<sup>85</sup> Ibid.

- Recognize and provide incentives to researchers that collaborate with the private sector, such as awards, prizes and tax breaks
- Improve intellectual property rights
- Develop an online platform for researchers, government and the private sector to collaborate and match needs with skills
- Facilitate the application of research findings to industrial contexts
- Strengthen the quality of research institutions and higher education
- Incentivise investors, such as angel investors or private equity funds, to invest in seed funding programs for research
- Develop a framework to incentivise academia-industry collaboration
- Promote more dialogue between academia and the private sector

Respondents from public agencies indicated that the Government should focus on the following actions to develop academia-industry collaboration further:

- Develop a concrete research policy and ecosystem for Cambodian researchers
- Develop national research ethics for data privacy and data protection, ensuring that every institution cares about data privacy and data protection

In summary, not enough collaboration is occurring between researchers and industry. Although research institutions may have units to facilitate such collaboration, they are not enough to translate into actual collaboration. There are few incentives for collaboration and those that exist – such as apprenticeship programmes for STEM students in collaboration with the private sector – lack clarity on how they function

## 2.8 ACADEMIC INPUT FOR POLICY

The contribution of research to policy in Cambodia could be improved. The restricted contribution can be attributed to inadequate research capacity, limited production of research relevant to policy needs, weak researchers' motivation to produce policy research, and inefficient dissemination of research findings. NGOs are generally more successful in influencing policy than universities because they are better served with time and funds to conduct and disseminate quality research. NGOs are also less likely than universities and think tanks to be hesitant about conducting and disseminating research that may be politically sensitive.<sup>86</sup>

When government officials were asked in the ESCAP survey whether they engage with researchers, there was a lot of variation between ministries in the overall level of engagement, but not so much in the type of research stakeholders they consulted (i.e., whether they engaged with researchers in universities, research institutes, the private sector or civil society). The Ministry of Mines and Energy, the Ministry of Foreign

Affairs and International Cooperation and MISTI responded that they consulted all the different types of research stakeholders. At the same time, other ministries carried out little to no consultation with any research stakeholders. Respondents gave examples of how research had an impact on policy (see table 2.8).

According to survey respondents, the main difficulties in translating research into policy are:

- Lack of policy-impact pathways
- Lack of an NRA that brings all stakeholders together
- Policy and reform agendas are constantly changing
- Lack of technical skills to translate research into policy
- Lack of scientists participating in policymaking processes
- Lack of communication between policymakers and researchers

<sup>86</sup> Cambodian Institute for Cooperation and Peace. Doing Research in Cambodia: Making Models that Build Capacity. 2016.

**Table 2.8 Examples of research input to policy, Cambodia**

<b>Ministry</b>	<b>Example of research impact on policy</b>
Economy and Finance	Findings from financial technology landscape study in Cambodia conducted from 2019 to 2020 by Techo Startup Center have convinced MEF to establish a FinTech centre to foster FinTech development in Cambodia.
Planning	The poverty mapping report conducted by the World Food Program and the Ministry of Planning provided some recommendations to inform policymaking.
Economy and Finance	To support entrepreneurship as an engine for long-term sustainable growth, the Ministry of Economy and Finance assessed the entrepreneurship ecosystem and funded research to inform the design of support tools and programs. As a result, the Ministry created the following schemes and institutions: <ol style="list-style-type: none"> <li>1- Techo Startup Center</li> <li>2- Cambodia SME Bank</li> <li>3- Skills Development Fund</li> <li>4- Entrepreneurship Development Fund and Khmer Enterprise</li> <li>5- Cambodia Credit Guarantee Corporation</li> </ol>

Source: ESCAP survey

## 2.9 RESEARCH POLICY AND REGULATORY FRAMEWORK

The Government of Cambodia, particularly MoEYS, has set policies to enhance the regulatory framework for research in the country. The Annual Operational Plan 2018 of the Education Congress 2018-2019 contains a subsection on scientific research, outlining several objectives related to improving quality assurance of graduate training programs and promoting research in higher education in STEM.<sup>87</sup>

The Policy on Research Development in the Education Sector, approved in 2011, seeks “to build the capacity of human resources in terms of knowledge, skills, ethics, creativity, innovation and entrepreneurship to maximize the long-term development of Cambodian society and economy in the globalization context”.<sup>88</sup> The policy addresses seven strategic areas:

- Research capacity

- Research quality
- Cooperative research
- Research reports
- Research ethics and permission for research
- International cooperation
- Marketing research and development

The policy is supported by the Master Plan for Research Development in the Education Sector (2011-2015), aimed solely at the (then) nine public HEIs supervised by the MoEYS. The five-year plan contains actions supporting the seven strategy themes, and each action specifies the objective, funding source and responsibility.

The Education Strategic Plan 2019-2023 contains nine strategic reforms relating to higher education. One of

<sup>87</sup> Ministry of Education, Youth and Sport. Education Congress 2018-2019. The education, youth and sport performance in the academic year 2017-2018 and goals for the academic year 2018-2019. 2019.

<sup>88</sup> Ministry of Education, Youth and Sport. Policy on Research Development in the Education Sector. 2010.

the strategic reforms is to “promote the quality of research” by:

- Establishing at least three research centres of excellence in public HEIs
- Creating a national fund for research in higher education
- Creating a mechanism to motivate those who perform good research
- Creating a partnership with enterprises and industries

Cambodia’s accession to the World Trade Organization in 2004 prompted the adoption of several laws regulating intellectual property rights. Relatively efficient procedures for registering and enforcing intellectual property rights are in place, and Cambodia’s intellectual property laws are relatively advanced compared to other ASEAN countries.<sup>89</sup> A partnership with the Intellectual Property Office of Singapore allows patent owners and applicants in Singapore to register with MISTI, and fast-track

procedures are also in place with the Japan Patent Office. Similar agreements were signed with the European Patent Office and China’s State Intellectual Property Office in 2017. Finally, Cambodia became a member of the Patent Cooperation Treaty in 2016. Most respondents to the ESCAP survey were aware of the existing national-level policy and regulation frameworks to support research and innovation;<sup>90</sup> however, they could not provide further details, suggesting a lack of clarity across different stakeholder groups on existing research policy. Moreover, there was a lack of agreement among stakeholders on the sufficiency of the intellectual property law to encourage innovation in research: While most found it somewhat sufficient, others hold more extreme negative and positive views. Several researchers thought there should be more communication around intellectual property law, such as through seminars, debates and conferences. Others stated that the problem is not the intellectual property law but rather the capacity of researchers to conduct innovative research.

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<sup>89</sup> United Nations Economic and Social Commission for Asia and the Pacific. *The Science, Technology and Innovation Ecosystem of Cambodia*. 2021.

<sup>90</sup> Four out of seven university respondents, eight out of eleven ministry respondents and two out of three private sector respondents.

# CHAPTER

# 3

# SWOT ANALYSIS

**Table 3.1 SWOT of the Cambodian research ecosystem, 2021**

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• <b>Academic and public institutes production is dynamic</b> and following an upward trend (albeit from a small base) – from little to no publications before the year 2000 to around 500 publications a year in 2018, 80 per cent being scientific articles. There have been nearly 5,000 scientific publications (articles, book chapters, etc.) with authors or co-authors affiliated with Cambodian research institutions in the past 20 years. Cambodia ranks 23rd in Asia based on scientific documents published in 2019 (and 19th if considering medical publications only).</li> <li>• <b>Cambodia is highly connected to (and reliant on) international research collaboration.</b> Between 2008 and 2013, 96 per cent of Cambodian articles involved at least one international co-author, a trend that may explain the high citation rate. Cambodians count with both Asian (Thailand and Japan) and Western scientists (United States, United Kingdom and France) among their closest collaborators.</li> <li>• <b>Cambodia has milestone STI policy documents:</b> Cambodia’s National Policy on Science, Technology and Innovation 2020-2030 and Cambodia’s Science Technology and Innovation Roadmap 2030</li> <li>• <b>Young population</b> among whom the demand for education is rising.</li> <li>• <b>Rising numbers of female students</b> in higher education. 47 per cent of students in tertiary education (undergraduate level) are women.</li> </ul>	<ul style="list-style-type: none"> <li>• Research in Cambodia is <b>concentrated in universities and public research institutes</b> and their research activities focus on producing scientific publications. Little research is happening in the private sector. Overall, researchers face severe limitations in conducting research including poor access to skilled and trained personnel and equipment, and poor maintenance of equipment and supplies. There are few applications for intellectual property protection from public research institutions.</li> <li>• <b>Limited attractiveness of research careers:</b> Salary and career progression are not attractive for international researchers, returning diaspora, or new Cambodian researchers.</li> <li>• <b>Lack of excellence in research</b> due to a low percentage of research staff holding a PhD; lack of clarity in performance evaluation of researchers and research institutions; and lack of sophisticated equipment. Researchers in universities face extreme time constraints to conduct high-quality research. Academic-industry collaboration is not sufficiently incentivised.</li> <li>• <b>There is a lack of alignment</b> on research topics perceived to be most important by ministries, research institutions, and the private sector.</li> <li>• <b>Gender inequality in research staff:</b> While this is improving, women only represent 23.7 per cent of research staff.</li> <li>• <b>Funding procedures are complex and time-consuming:</b> It is difficult for researchers to quickly find information on available funding schemes.</li> <li>• Available research funding is insufficient.</li> <li>• Societal recognition of research and researchers is insufficient.</li> </ul>

Opportunities	Threats
<ul style="list-style-type: none"> <li>• <b>Good momentum, in terms of motivation, for promoting research activities:</b> Increasing recognition of the importance of research; half of the research institutions intend to increase the number of their research staff in the next three years.</li> <li>• Priority research topics have been identified, although they need further refining.</li> <li>• All stakeholders are <b>aligned on the importance of climate change</b> as a major future challenge to be faced by Cambodia.</li> <li>• Collaboration with ASEAN countries is an excellent means to enhance national research.</li> <li>• <b>University-private sector collaboration</b> could provide new sources of revenue for universities that could be used to improve researchers' salaries.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Competition for funding</b> with international laboratories is high, and the lack of excellence in research means that Cambodia does not have the required competitive edge.</li> <li>• The lack of excellence in research drives the private sector in Cambodia to collaborate with <b>research laboratories in other countries</b>.</li> </ul>



# CHAPTER

# 4

## CONCLUSION AND RECOMMENDATIONS

One of the actions included under Cambodia's Science, Technology, and Innovation Roadmap 2030 is to develop a national research agenda. Such an agenda should set clear ambitions and directions for research to be conducted in Cambodia and support inclusive and sustainable development in line with national priorities and the 2030 Agenda for Sustainable Development. Based on the current strengths, weaknesses, opportunities and threats identified for research in Cambodia, a national research agenda should address the following priorities, in alignment with Cambodia's National Policy on Science, Technology and Innovation 2020-2030 and Cambodia's Science Technology and Innovation Roadmap 2020-2030:

- **Align research topics with national developmental needs:** Define mission-oriented research to respond to the development challenges of Cambodia and ensure that impactful research is conducted.
- **Introduce a research fund dedicated to financing the national research agenda** managed by a research fund committee and providing clear and accessible procedures for researchers.
- **Clarify the roles, mandates, means, objectives and budgets of government research institutes:** Increase the proportion of funds provided towards applied research (70 per cent applied<sup>91</sup>); publicly-funded research and training organisations should facilitate the application of research findings to applied industrial contexts.
- Select some publicly-funded research and training organisations to become centres of excellence in research, providing them with adequate funding, sophisticated equipment and hiring a qualified and gender-balanced body of researchers.
- **Introduce an attractive research career system and incentives for researchers,** such as PhD funding, grants, and reward programmes to valorise careers in research.
- **Incentivise the private sector to conduct research in collaboration with academia** by promoting intellectual property protection mechanisms, offering grant schemes dedicated to academia-industry research, and developing an online platform for researchers, government, and private sector to collaborate and match needs with skills.
- **Develop strong international networks with universities** to promote research collaboration, providing researcher mobility schemes.
- Create an environment to support visiting researchers through facilitating working permits.
- **Inform and train policymakers to integrate research into policymaking** by identifying policy research needs, funding translational research, establishing permanent communication channels between researchers and policymakers, and establishing a research ethics committee.

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<sup>91</sup> Ministry of Industry, Science, Technology and Innovation. Science Technology and Innovation Policy 2020-2030. 2019.

# Appendix A

## THEMATIC ALIGNMENT OF NATIONAL POLICIES

**Table A.1 Thematic Alignment of National Policies**

SDGs	Rectangular Strategy <sup>92</sup>	National Strategic Development Plan 2019-2023 <sup>93</sup>	National Policy on Science Technology and Innovation 2020-2030 <sup>94</sup>	Cambodia Industrial Development Policy 2015 - 2025 <sup>95</sup>	Cambodian ICT Masterplan 2020 <sup>96</sup>	Education Strategic Plan 2019-2023 <sup>97</sup>	Development of the National Productivity Master Plan for Cambodia 2020-2030 <sup>98</sup>
Goal 1: End poverty in all its forms everywhere		3. Human Resource Development					
Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	1.3. Improving public healthcare and nutrition	3.3. Enhancement of Public Health and Nutrition					
Goal 3: Ensure healthy lives and promote well-being for all at all ages	1.3. Improving public healthcare and nutrition	3.3. Enhancement of Public Health and Nutrition					
Goal 4: Ensure inclusive and equitable quality education and promote	1.1. Improving the quality of education, science and	3.1. Strengthening of the Quality of Education, Science and Technology	5.1. Developing and strengthening adequate STI human resources with	4. Coordinating supporting policies such as human resource	1. Empowering people	Increase access to quality, equitable and inclusive ECE services.	

<sup>92</sup> [2 Rectangular Strategy Phase IV.PDF](#)

<sup>93</sup> [http://cdc-crdp.gov.kh/en/strategy/documents/nsdp-2019-2023\\_en.pdf](http://cdc-crdp.gov.kh/en/strategy/documents/nsdp-2019-2023_en.pdf)

<sup>94</sup> [National Policy on Science Technology and Innovation 2020-2030.pdf](#)

<sup>95</sup> [Cambodia Industrial Development Policy 2015-2025 \(official translation\).pdf](#)

<sup>96</sup> [4 Cambodian-ICT-Masterplan-2020 \(Koica\).pdf](#)

<sup>97</sup> [Education Strategic Plan 2019-2023.pdf](#)

<sup>98</sup> [Productivity Master Plan for Cambodia's \(3 Nov 19\).pdf](#)

Table A.1 Thematic Alignment of National Policies

SDGs	Rectangular Strategy <sup>92</sup>	National Strategic Development Plan 2019-2023 <sup>93</sup>	National Policy on Science Technology and Innovation 2020-2030 <sup>94</sup>	Cambodia Industrial Development Policy 2015 - 2025 <sup>95</sup>	Cambodian ICT Masterplan 2020 <sup>96</sup>	Education Strategic Plan 2019-2023 <sup>97</sup>	Development of the National Productivity Master Plan for Cambodia 2020-2030 <sup>98</sup>
lifelong learning opportunities for all	technology;1.2. Vocational training	3.2. Technical Training	quantity, quality and composition with professional ethics by considering gender equality. 5.2. Enabling prominent STI human resources to perform leading tasks; and establishing filtering and promoting mechanisms in order to create enabling environment for national STI human resources to perform their full potentials.	development, skills training and industrial relations improvement, implementation of land management, urbanization and land use plan in line with the Land Policy and the National Policy on Land Management together with infrastructure development, including transport/logistics system and digital connectivity, electricity, and clean water supply and other supporting services such as public services, social services and financial services.		Policy 1: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
Goal 5: Achieve gender equality and empower all women and girls	1.4. Strengthening gender equality and social protection.	3.4. Improving Gender Equity and Social Protection	5.1. Developing and strengthening adequate STI human resources with quantity, quality and composition with professional ethics by considering gender equality.				
Goal 6: Ensure availability and sustainable management of water and sanitation for all	1.3. Improving public healthcare and nutrition	6.2. The Sustainable Management of Natural Resource and Culture		4. Coordinating supporting policies such as human resource development, skills training and industrial relations improvement,		Strategy 1.5: Provide WASH and nutrition, and health promotion in pre-schools	

Table A.1 Thematic Alignment of National Policies

SDGs	Rectangular Strategy <sup>92</sup>	National Strategic Development Plan 2019-2023 <sup>93</sup>	National Policy on Science Technology and Innovation 2020-2030 <sup>94</sup>	Cambodia Industrial Development Policy 2015 - 2025 <sup>95</sup>	Cambodian ICT Masterplan 2020 <sup>96</sup>	Education Strategic Plan 2019-2023 <sup>97</sup>	Development of the National Productivity Master Plan for Cambodia 2020-2030 <sup>98</sup>
				implementation of land management, urbanization and land use plan in line with the Land Policy and the National Policy on Land Management together with infrastructure development, including transport/logistics system and digital connectivity, electricity and clean water supply and other supporting services such as public services, social services and financial services.			
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all	4.2. Strengthening sustainable management of natural and cultural resources	6.2. The Sustainable Management of Natural Resource and Culture		4. Coordinating supporting policies such as human resource development, skills training and industrial relations improvement, implementation of land management, urbanization and land use plan in line with the Land Policy and the National Policy on Land Management together with infrastructure development, including transport/logistics system and digital connectivity,			

**Table A.1 Thematic Alignment of National Policies**

SDGs	Rectangular Strategy <sup>92</sup>	National Strategic Development Plan 2019-2023 <sup>93</sup>	National Policy on Science Technology and Innovation 2020-2030 <sup>94</sup>	Cambodia Industrial Development Policy 2015 - 2025 <sup>95</sup>	Cambodian ICT Masterplan 2020 <sup>96</sup>	Education Strategic Plan 2019-2023 <sup>97</sup>	Development of the National Productivity Master Plan for Cambodia 2020-2030 <sup>98</sup>
				electricity and clean water supply and other supporting services such as public services, social services and financial services.			
Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all		5.1. Job Market Development				Develop digital, entrepreneurship, young leadership and other soft-skills programmes for youth development	1. Uplift long tail of small and medium-sized enterprises 2. Groom productive and competitive local large enterprises 3. Promote overriding productivity message for each sector
Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	4.4. Ensuring environment sustainability and readiness for climate change. 3. Promotion of private sector development and employment	4.1. Improving the Logistics System and Enhancing Transport, Energy, and Digital Connectivity 4.2. Development of Key and New Sources of Growth 4.3. Preparing for Digital Economy and the Fourth Industrial Revolution. 6.3. Strengthening Urban Planning and Management.	5.3. Enabling national research and development in an efficient and effective way focusing on the adaptation of acquired technologies to the local context and enhancing capacity to absorb foreign technologies. 5.4. Developing and strengthening dynamic innovation ecosystem with capacity to synthesize technologies and engineering to acquire national achievements with	4. Coordinating supporting policies such as human resource development, skills training and industrial relations improvement, implementation of land management, urbanization and land use plan in line with the Land Policy and the National Policy on Land Management together with infrastructure development, including transport/logistics system and digital connectivity, electricity and clean water	3. Enhancing capabilities 3.1. ICT industry	Enhance digital skills and promote the application of knowledge on Science, Technology, Engineering and Mathematics (STEM) for youth in response to the fourth industrial revolution	Productive enterprises Competitive business enablers High-value added sectors

Table A.1 Thematic Alignment of National Policies

SDGs	Rectangular Strategy <sup>92</sup>	National Strategic Development Plan 2019-2023 <sup>93</sup>	National Policy on Science Technology and Innovation 2020-2030 <sup>94</sup>	Cambodia Industrial Development Policy 2015 - 2025 <sup>95</sup>	Cambodian ICT Masterplan 2020 <sup>96</sup>	Education Strategic Plan 2019-2023 <sup>97</sup>	Development of the National Productivity Master Plan for Cambodia 2020-2030 <sup>98</sup>
			incremental innovation in order to foster prioritized national industries and businesses for local consumption and export aiming at more productive development.	supply and other supporting services such as public services, social services and financial services.			
Goal 10: Reduce inequality within and among countries							
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable							
Goal 12: Ensure sustainable consumption and production patterns		6.4. Ensuring the Environmental Sustainability and Pre-emptive Response to the Climate Change.	5.5. Instilling in society an STI culture in an inclusive manner, with the aim to ensure public confidence and trust on products and services that use national technologies, and ensure that those who made efforts and investments in STI development have satisfaction of their achievements as well as satisfaction of the outcomes of STI governance reform.		2.2. Legal framework 4. Enriching e-services		
Goal 13: Take urgent action to combat climate change and its impacts		6.4. Ensuring the Environmental Sustainability and Pre-emptive	5.5. Instilling in society an STI culture in an inclusive manner, with the aim to ensure public		2.2. Legal framework 4. Enriching e-services		



**Table A.1 Thematic Alignment of National Policies**

SDGs	Rectangular Strategy <sup>92</sup>	National Strategic Development Plan 2019-2023 <sup>93</sup>	National Policy on Science Technology and Innovation 2020-2030 <sup>94</sup>	Cambodia Industrial Development Policy 2015 - 2025 <sup>95</sup>	Cambodian ICT Masterplan 2020 <sup>96</sup>	Education Strategic Plan 2019-2023 <sup>97</sup>	Development of the National Productivity Master Plan for Cambodia 2020-2030 <sup>98</sup>
		Response to the Climate Change.	confidence and trust on products and services that use national technologies, and ensure that those who made efforts and investments in STI development have satisfaction of their achievements as well as satisfaction of the outcomes of STI governance reform.				
Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development		6.2. The Sustainable Management of Natural Resource and Culture.					
Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss		6.2. The Sustainable Management of Natural Resource and Culture.					
Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels		3.4. Improving Gender Equity and Social Protection.					

Table A.1 Thematic Alignment of National Policies

SDGs	Rectangular Strategy <sup>92</sup>	National Strategic Development Plan 2019-2023 <sup>93</sup>	National Policy on Science Technology and Innovation 2020-2030 <sup>94</sup>	Cambodia Industrial Development Policy 2015 - 2025 <sup>95</sup>	Cambodian ICT Masterplan 2020 <sup>96</sup>	Education Strategic Plan 2019-2023 <sup>97</sup>	Development of the National Productivity Master Plan for Cambodia 2020-2030 <sup>98</sup>
Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development				2. Second, developing and modernizing SMEs by way of expanding and strengthening the manufacturing base, modernizing and officially registering enterprises, promoting technology development and transfer and strengthening industrial linkages between domestic and foreign enterprises specifically in the agro-industrial sector;			
Goal 18: End the negative impact of Mine/ERW and promote victim assistance							

# Appendix B

## STAKEHOLDERS CONSULTED

### Stakeholder survey

#### Universities, research institutes and think tanks

Eight responses from seven different academic institutions (universities/research institutes/think tanks) provided survey data.<sup>99</sup> Respondents were from:

- Asian Vision Institute (AVI; research institute)
- Cambodia Development Research Institute (CDRI; research institute/think tank)
- Institute of Technology of Cambodia (ITC; research institute)
- National Polytechnic Institute of Cambodia (NPIC; research institute)
- Royal University of Agriculture (RUA; university)
- Royal University of Phnom Penh (RUPP; university)
- University of Health Sciences (UHS; university)

#### Private sector organisations

Four responses from the following four private sector organisations were received:

- Amru Rice Cambodia Co., Ltd. (ARC)
- Cambodia Chamber of Commerce (CCC)
- Mong Rethy Group Co., Ltd. (MRG)
- SME Bank of Cambodia (SME)

#### Ministries

Sixteen responses from 13 different ministries provided data<sup>100</sup>. Respondents were from:

- Ministry of Agriculture, Forestry and Fisheries (MAFF)
- Ministry of Commerce (MoC)

- Ministry of Economy and Finance (MEF)
- Ministry of Education, Youth and Sport (MoEYS)
- Ministry of Foreign Affairs and International Cooperation (MFAIC)
- Ministry of Health (MoH)
- Ministry of Industry Science Technology & Innovation (MISTI)
- Ministry of Interior (MoI)
- Ministry of Mines and Energy (MME)
- Ministry of Planning (MoP)
- Ministry of Posts and Telecommunication (MPTC)
- Ministry of Public Works and Transport (MPWT)
- Ministry of Water Resources and Meteorology (MoWRAM)

#### Stakeholder interviews

- Representatives from six ministries were interviewed:
  - Ministry of Agriculture, Forestry and Fisheries (MAFF)
  - Ministry of Economy and Finance (MEF)
  - Ministry of Education, Youth and Sports (MoEYS)
  - Ministry of Foreign Affairs and International Cooperation (MFAIC)
  - Ministry of Health (MoH)
  - Ministry of Post and Telecommunication (MPTC)

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<sup>99</sup> There were two respondents from RUA. Unless stated otherwise, these two respondents were treated as one response each; that is, the unit of response is the respondent, not the institution.

<sup>100</sup> There were two respondents from the MOC, MFF and MISTI. Unless stated otherwise, each respondent was treated as a response, that is, the unit of response is the respondent, not the ministry.

# Appendix C

## RESEARCH ECOSYSTEM SURVEY RESPONSES

### Research Organisations

#### How central is research to the mission of universities and research institutes?

- Universities/research institutes/think tanks

Out of eight university/research institute respondents, the vast majority (seven) stated that research was “very important” to their institution (only the NPIC stated that research was only “somewhat important”) and the majority (six) also stated that research played a major role in their university (only NPIC and the AVI stated it played a minor role).

Concerning the main research goals of the institutions, CDRI and AVI conduct research to have an impact on policy. In contrast, RUA aimed to have more of an impact in the private sector, with a goal of having more than 50 research findings adopted by the private sector in the next ten years. UHS aimed to be nationally and internationally recognised as a centre of excellence for

research and innovation. RUPP had three very specific goals:

- Goal 1: To establish a system for ensuring research quality and protecting intellectual property.
- Goal 2: To mobilize financial resources and advance research infrastructure for postgraduate and postdoctoral programs in each faculty.
- Goal 3: To implement research-only positions at the university and other motivation schemes for faculties that realize outstanding achievement.

As such, research was considered important by most institutions, but there was an even split in terms of how they wanted the research they generated to be used: For its own sake, for excellence in research (UHS, RUPP), to guide policy (CDRI, AVI) or to benefit the private sector (RUA). Moreover, five out of the eight institutions had a written research strategy (Table C.1)

**Table C.1 Academic institutions with a written research strategy**

Institution	Nature of written research strategy
AVI	Research strategy adopted and adapted according to research type
RUPP	Policy on Research Development and Innovation
RUA	Contained in the updated university 10-year strategy <sup>101</sup>
CDRI	Stated in its five-year strategic plan
UHS	(No further details given)

Source: ESCAP Survey

The percentage of time that research staff spent on research ranged from five per cent at NPIC to 90 per cent at CDRI. Half of the respondents (RUA, AVI, RUPP)

stated that this percentage had increased in the last three years. When asked if they intended to increase the number of research staff over the next three years,

<sup>101</sup> Respondent stated that RUA used to have a draft research agenda and research policy but it is not yet complete, needs improving and updating.

half (RUA, AVI, RUPP, UHS) said they strongly intended to increase it. RUA expanded on this, commenting that they wish to increase research activity and plan to clarify whether research and teaching should be separate roles or combined. This suggests some modest motivation or action to increase research activity.

**How many research staff and doctoral students are there at these universities and research institutes?**

AVI and NPIC had a small research staff of 5 or 6 people, while CDRI and RUPP have a medium-sized research staff of 30 and 60 people, respectively. ITC has a large staff of 105 people, UHS has 161 people, and RUA has 305 people. The proportion of female research staff varied from 0 per cent at NPIC to 50 per cent at AVI and CDRI. The percentage of research staff who already held a PhD was fairly low, ranging from 0 per cent at NPIC to 25 per cent at ITC and CDRI.

The number of PhD students per institution varied from 0 at NPIC, UHS and CDRI, while AVI has eight students (five per cent being women), RUPP 20 students (20 per cent being women), RUA 31 students (20 per cent being women) and ITC 89 (10 per cent being women).

In line with existing research, in this sample, the proportion of women at both the PhD and staff level is too low, as is the proportion of staff with a PhD.

**What is the state of research equipment and infrastructure?**

When asked the extent to which the research infrastructure at their institution (scientific equipment, computer software and hardware, libraries and archives) was sufficient for their research needs, one institution (RUA) said it was not at all sufficient, four said that it was somewhat sufficient (AVI, NPIC, RUPP and UHS) while only two institutions said it was very sufficient (ITC and CDRI). The provision of technical support staff was perceived as slightly better, with five institutions saying it was somewhat sufficient (RUA, AVI, RUPP, UHS, ITC) and two institutions saying it was very sufficient (NPIC and CDRI).

When asked how infrastructure could be improved, respondents mentioned needing computers, software and databases, research management solutions, human resources and specialised scientific equipment.

**How does this compare to organisations carrying out research in the private sector?**

- Private sector

ARC and MRG stated that they conducted a small amount of research, which was conducted both in-

house and at a dedicated external research unit. ARC stated that research was very important to their company; its purpose was product development and socio-economic impact on the supply chain. Their main goal was to identify potential new means of product diversification. MRG also stated that research was very important to their company; its purpose was product development in line with consumer needs. Their main goal was to improve products so that they could be produced more efficiently and meet consumer needs better. SME and CCC stated that they carried out very little research. None of the organisations had a written research strategy.

ARC and MRG had three and five researchers among its staff, respectively. They both stated that their research staff spent around 20 per cent of their time on research, that this had not changed in the last three years, and that they had moderate intentions to increase the number of research staff in the next three years.

In terms of research infrastructure, ARC said it could be improved by increasing its human resources – specifically, by having more experts on food and markets. MRG said they wanted access to online databases of existing data. ARC was not interested in sharing infrastructure with universities and research institutes, but MRG said they would be interested.

**Research Topics**

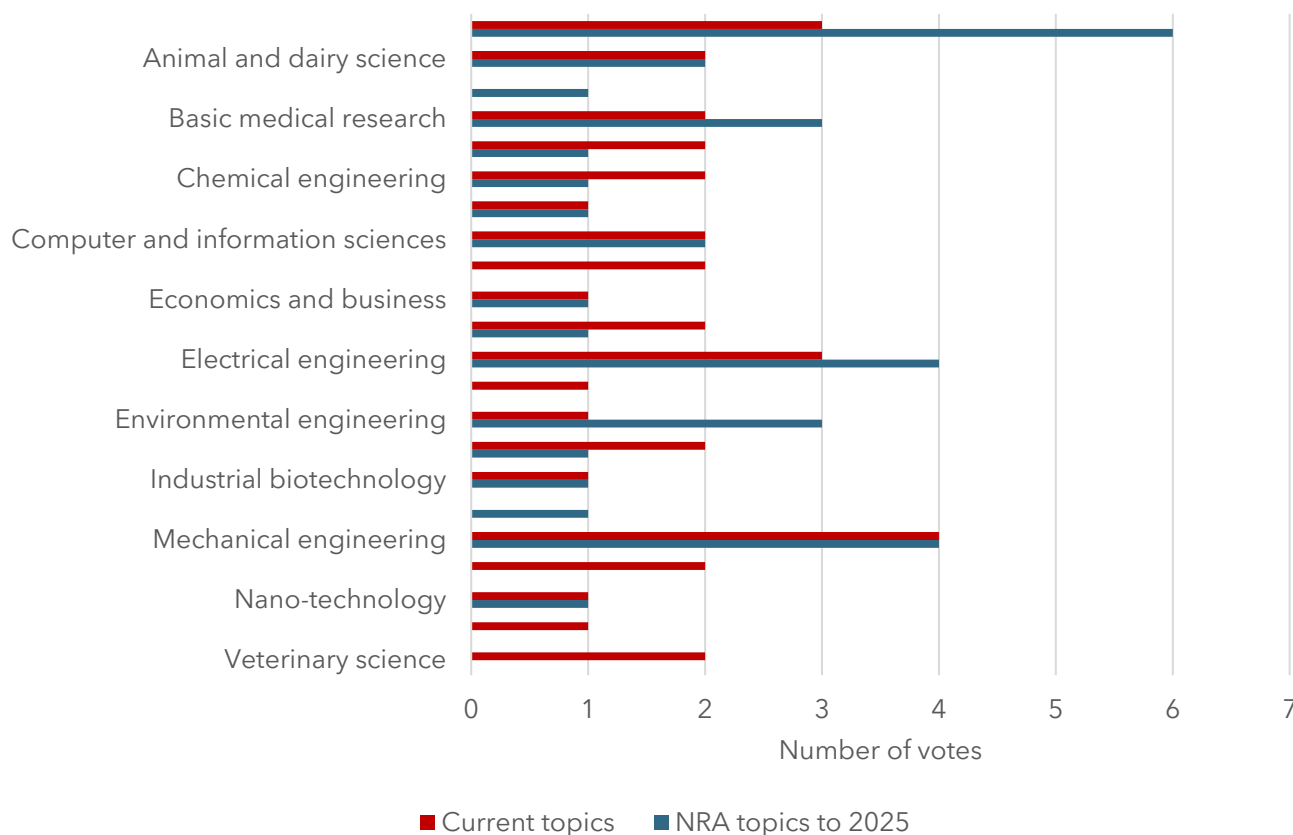
**What are the main research topics and to what extent do they address current challenges faced by Cambodia?**

**What are some of the future challenges likely to be faced by Cambodia, and what research topics should Cambodian researchers focus on to address them?**

- Universities/research institutes and private sector

For these questions, universities/research institutes and the private sector were analysed together, as commonalities are of interest here. Respondents were asked about the five current main research topics at their institution. The topics most often reported were agriculture, forestry and fisheries, electrical engineering and mechanical engineering (see red bars in Figure C.1). When asked about what topics the NRA should focus on until 2025 to address future challenges of Cambodia, they primarily mentioned agriculture, forestry and fisheries, followed by engineering (mechanical and electrical), basic medical research and environmental engineering (see blue bars in Figure C.1).

**Figure C.1 Current most researched topics in Cambodia and research topics that should be a priority of the NRA 2025 according to universities/research institutes and private sector.**



Source: ESCAP Survey

When asked the extent to which the current research topics addressed the problems currently faced by Cambodia, the response was mixed: 5 respondents said “yes, very much so”; and 4 said “somewhat”. When asked for further detail, they mostly spoke of how agricultural research was addressing the problem of climate change, allowing for more sustainable products and practices. The future challenges they spoke of Cambodia facing were also mostly related to climate change, calling for research to support products and practices that were more clean, safe, sustainable and also competitive.

- **Ministries**

Ministries were asked about the five research topics that were currently most important to their mission at the ministry.<sup>102</sup> “Economics and business” was by far the most frequently cited topic, followed by “agriculture, forestry and fisheries”, then “computer and information sciences”, “environmental biotechnology” and “educational science” (see red

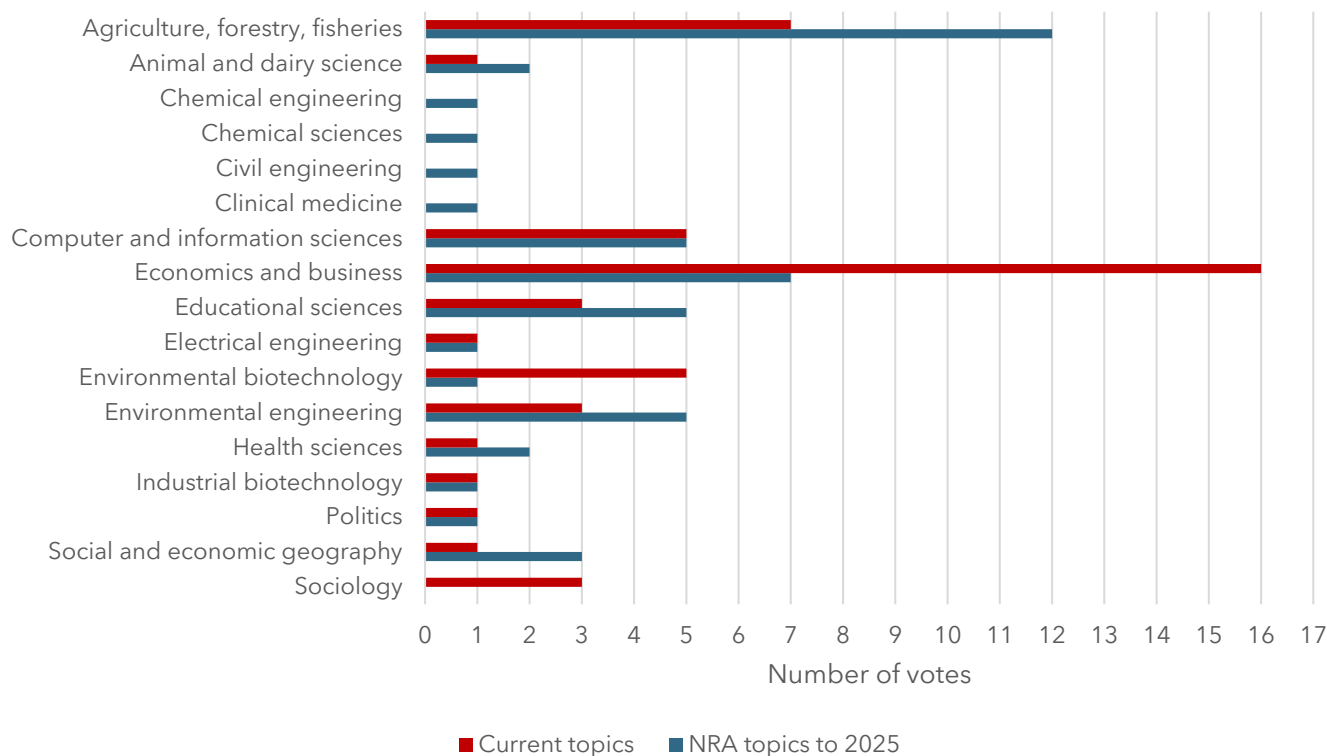
bars in Figure C.2). When asked what topics the NRA should include to address Cambodia’s future challenges, responses shifted somewhat; the majority mentioned “agriculture, forestry and fisheries”, followed by “economics and business”, “computer and information sciences”, “educational science” and “environmental engineering” (see blue bars in Figure C.2). When asked whether the research institutions under their supervision were addressing the current research topics listed, nine out of 15 said “somewhat”, four said “not at all”, and only two said “very much so”. Indeed, the research topics most important to the ministries are not particularly aligned with those currently being researched in the universities/research institutes and the private sector. However, when asked the extent to which the stated research topics addressed Cambodia’s current societal, economic and environmental development needs, 11 out of 14 of respondents said “very much so”, two said “somewhat”, and one “not at all”.

<sup>102</sup> N.B., 9 “other” responses non-codable so not included here.

The future challenges they mentioned being faced by Cambodia include climate change and economic recovery from COVID-19. Interestingly, all stakeholders seemed to think agriculture, forestry and fisheries would be the research topic that best addressed the

future needs of Cambodia (even if they did not believe it to be the most important topic currently). It could be the case that the prospect of climate change evokes predictions of failed crops and hunger.

**Figure C.2 Current most researched topics in Cambodia and research topics that should be a priority of the NRA 2025 according to ministries**



Source: ESCAP Survey

## Research Funding

### How is research funded?

**Table C.2 Funding received from public and private funding sources in 2020, by institution**

displays the amount of funding received from public and private funding sources in 2020, by institution (in this case, the unit of analysis is the institution, not the respondent). It then shows the relative level of funding received by institution from various sources (“no funding”, “minor source of funding”, and “major source of funding”). Only UHS stated that they had an official written research funding strategy.

In terms of funding, RUPP appears to attract the highest amount of funding, followed by ITC. The most common funding source was international organisations and development funds (major source of funding for three institutions), and the least common was business and business organisations (minor source for three institutions). Still, there is a fair amount of variance in funding sources across institutions.

- Universities/research institutes

Government funding was channelled through the institutions in various ways: In one institution (RUA) by a block grant mechanism, in another (CDRI) by competitive calls, in a third institution by a combination of both (ITC) and three institutions stated by other methods - via an annual budget plan (NPIC), via a HEIP project (RUPP) and by funding for data collection or publications (UHS). AVI and CDRI reported to have a lot of experience in competitive calls for research projects; all other institutions had moderate experience.

When asked the main difficulties they faced in raising funds for research in their university/ research institute, respondents cited:

- Lack of information on funding sources
- Limited funding
- Too much competition (especially from international research institutes)



- Lack of time - salaries are low, so researchers often have to take on extra teaching, which does not leave sufficient time to apply for research funds
  - Suggestions from respondents on what needs to be changed at the government level to improve research funding included:
    - Annual declaration of research topics and funds
    - Develop clear policy, agenda, roadmap and guidelines for research
    - Ensure transparency in research grant management
    - Ensure researchers have more time to dedicate to research
    - Incentivise the private sector to fund research
- Increase the amount of research funding relative to GDP
- Open more funding sources for competitive calls
  - Set up research fund committee

### Table C.2 Funding received from public and private funding sources in 2020, by institution

Institution	Total funding from public sources (i.e., ministries) (Millions of KHR)	Total funding from private sources (Millions of KHR)	Government grants	International organisations/ development funds	Non-profit foundations, charities or NGOs	Business and business organisations
AVI	0	20	None	Minor	Minor	Minor
CDRI	600	4 800	Minor	Major	Minor	Minor
ITC	4 950	80	Major	Major	Minor	None
NPIC	80	20	Major	None	None	Minor
RUA	360	0	Minor	Major	None	None
RUPP	4 000	4 000	Minor	Minor	Minor	None
UHS	0	0	Minor	Minor	Major	None

Source: ESCAP Survey

#### • Private sector

below displays the monetary amount of funding received from public and private sources and the relative level of funding received from various sources (no funding vs. minor source of funding vs. major source of funding) by organisation, in 2020

None of the organisations reported receiving any funding from public sources (i.e., ministries); however, CCC reported to have benefitted from public incentives through a block grant mechanism.

Regarding the main difficulties to raise research funds, respondents mainly spoke of the difficulty of the procedures involved in accessing funding and suggested that a set of clear guidelines plus the possibility to apply online would make the process simpler for them. ARC and MRG reported having some experience with competitive calls, but SME and CCC had none. Also noteworthy: None of the organisations had an official written research funding strategy.

**Table C.3 Funding received from public and private sources and the relative level of funding received, by private sector institutions in 2020**

Institution	Total funding from public sources (i.e., ministries) (Million KHR)	Total funding from own budget (Million KHR)	Government grants	International organisations/development funds	Non-profit foundations, charities or NGOs
ARC	0	50	None	Minor	None
CCC	0	0	Major	Minor	Minor
MRG	0	200	None	None	Minor
SME	0	0	None	None	None

Source: ESCAP Survey

- Ministries

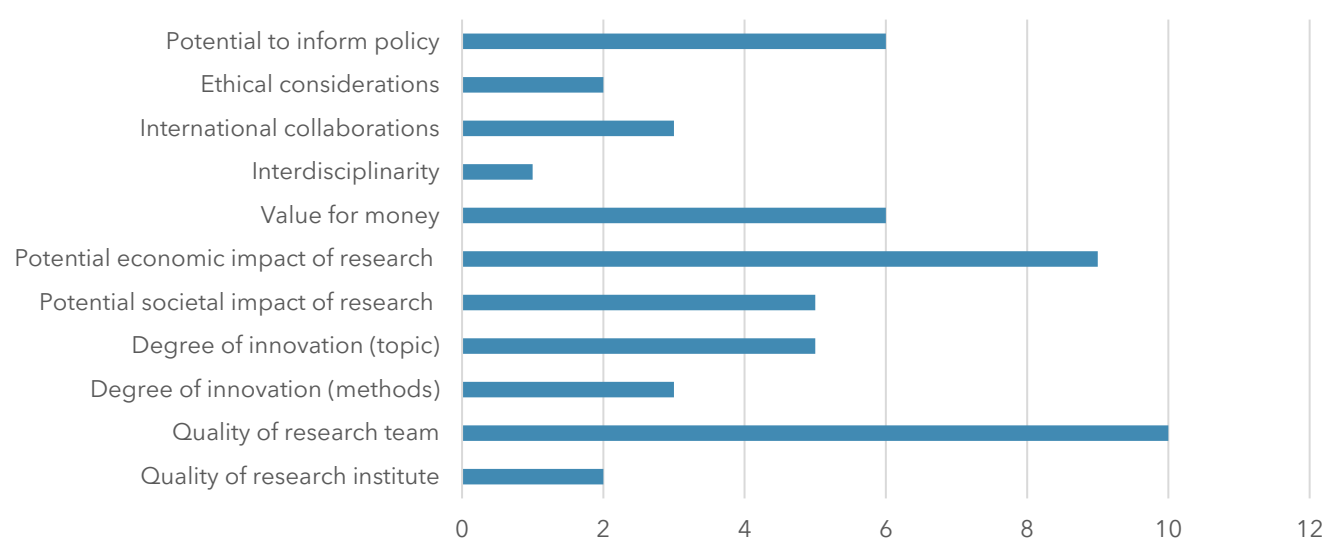
Each ministry respondent indicated their criteria to decide which research projects received funding. Figure C.3 shows the results: The “quality of the research team” was most often highlighted, followed by the “potential economically impacts of the research”, “potential to inform policy” and “value for money”.

Respondents had varied suggestions when asked how the NRA could improve research funding. Several respondents thought the NRA should prioritise research topics that best support the economic growth of Cambodia, which would then help the government and other funders allocate research funds more efficiently. Another respondent wanted the NRA to set up an institutional review board to ensure that all

research conducted was ethical. Other recommendations included:

- Funding should also focus on incentives for researchers
- Improving financial management procedures in administering research activities
- Funding research capacity-building and international collaboration
- NRA should develop a funding mechanism
- Administering block grants directly to the research team with a stronger M&E approach
- Strengthening the research support team

**Figure C.3 Criteria ministries use to decide which research projects received funding**



Source: ESCAP Survey

## Research quality and performance

### What is the research output of universities and research institutes in Cambodia?

- Universities/research institutes

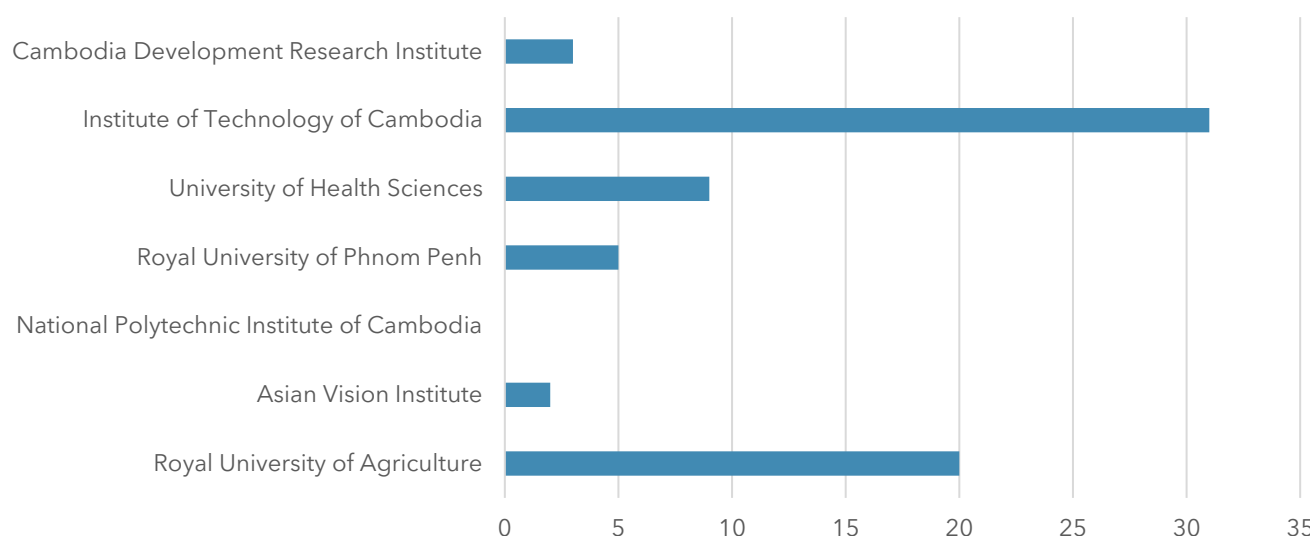
Figure C.4 shows how many articles authored by staff/students at each institution were published in international peer-reviewed journals in 2020.

### How are researchers and research institutions evaluated and how could this be improved?

- Universities/research institutes

Table C.4 below shows the criteria for judging performance stated to be most important for university/research institute respondents, in addition to their personal assessment of how effective and fair are the evaluation methods.

**Figure C.4 Articles authored by staff/students published in international peer-reviewed journals in 2020, by academic institutions**



Source: ESCAP Survey

In general, evaluation methods are not perceived as very effective or fair. Respondents suggested more clarity in guidelines, clear KPIs, and improved criteria to enhance these methods. They also recommended the delivery of a feedback seminar to build capacity and improve evaluation methods.

Only two out of seven of respondents strongly agreed that career progression currently depends on publications; the rest said progression depends only slightly on publications. Three out of seven respondents strongly agreed that career progression depended on international collaboration projects. Other suggestions for factors that affected career progression were innovation, contribution to policy and research, student demands and dissemination activities.

Several respondents reported issues in attracting and training young researchers, and this was generally perceived to be because of the low salary. To attract more young researchers, they suggested better salaries, but also other forms of support such as access to data, funding opportunities, clarified career

pathways (well-defined role levels), and more technical support staff.

Half the respondents thought it was somewhat difficult for women researchers to advance in their careers due to increased time pressure from childcare and cultural prejudices. To overcome this, respondents suggested that the NRA should propose quotas for female research staff, scholarships/grants for women, and better provision of childcare support.

Just over half of respondents stated that they did have an incentive system in place at their institution for good performance. Good performance was determined by publications, research projects, and other indicators. The incentive involved was mostly professional recognition in the form of awards, financial rewards and career promotion.

Three out of seven respondents were aware of a national code of ethics (for health research, under the MoH) and reported that it is useful to them. Only one respondent was aware of an institutional code of ethics (AVI). When asked what are the main difficulties, they face in performing rigorous scientific research in Cambodia, they mentioned a lack of:

- Funding
- Capacity
- Infrastructure
- Clear guidelines (in the form of policies, roadmaps, and agendas)
- Supporting regulations
- Access to data

**Table C.4 Top criterium for judging researcher's performance by institution and assessment of its effectiveness and fairness**

Institution	Most important criteria for judging performance	Are evaluation methods effective?	Are evaluation methods fair?
AVI	Relevance to matters of national importance	somewhat	somewhat
CDRI	Relevance to matters of national importance	somewhat	somewhat
ITC	Number of Masters students attracted	somewhat	somewhat
NPIC	Relevance to matters of national importance	not	not
RUA	Degree of innovation	somewhat	somewhat
RUPP	Number of collaborations with industry	not	not
UHS	Number of published articles	somewhat	very

Source: ESCAP Survey

#### How are researchers in the private sector evaluated and how could this be improved?

- Private sector

Two respondents said they had significant problems attracting and training young researchers, and two said they had only moderate problems. One respondent (ARC) thought this was because of a lack of grants and funding for young researchers. MRG thought the NRA should prioritise attracting more young researchers and allocate more grants for this goal. None of the private sector respondents felt that women in particular faced problems in advancing their careers in research.

None of the respondents knew of a national or institutional code of ethics. In response to the difficulties, they faced in conducting rigorous scientific research in Cambodia, MRG responded that the main problem was a lack of access to research findings and accurate and adequate research communication in general.

#### How do ministries evaluate researchers and how could this be improved?

- Ministries

Six out of 13 respondents judged that the relevance of the research to matters of national interest was the most important factor in considering research performance; four respondents thought it was the degree of innovation; and three considered it was the number of collaborations with industry.

None of the respondents was aware of a national code of research ethics apart from MoEYS, which highlighted the code of ethics for health research (Standard Operating Procedures for National Ethics Committee for Health Research in Cambodia). Notwithstanding, these respondents felt that the code of ethics for health research needed updating as it had been prepared in 2008.

Respondents stated that the main difficulties in performing rigorous science in Cambodia are a lack of:

- Sustainable research funding
- Budget planning and management (it is not just difficult to obtain financing but also to use that funding efficiently)
- Human resources (qualified and committed lecturers to train the next generation, possibly due to low motivation linked to low perceived status of researchers)
- Capacity of researchers (often forced to take on extra work due to low salary)
- Incentives for researchers
- National and international collaboration
- Research ethics
- Equipment
- Policy commitment

When asked what the NRA should include to improve the quality of research conducted in Cambodia, the respondents mentioned:

- Mechanisms to generate incentives such as additional income for researchers
- More investment in human resources (and more effective management of this funding)
- Research ethics guidelines
- Mechanisms to increase the perceived value of research and researchers
- Mechanisms to increase national and international collaboration
- Research monitoring and evaluation tools
- Initiatives to set up specialised research centres within universities
- Directionality on priority research topics

One respondent also pointed out that there would need to be activities to raise awareness about the NRA to ensure maximum engagement.

## Researcher mobility and international collaboration

### To what extent does researcher mobility and international collaboration currently exist in Cambodia?

- Universities/research institutes and ministries

Ministries were not aware of any schemes to support international mobility of researchers for short-term or medium-term research leave. Regarding academic institutions, NPIC reported a provision of 50 per cent of the basic salary for researchers on leave. RUPP said

government regulations covered this for teachers. CDRI said there was a provision for international research exchanges.

Half of the respondents from ministries said it could be difficult to attract researchers back to Cambodia when they have researched or studied abroad, and all but one university/research institute respondent said this was difficult. This was perceived by both stakeholder groups to be caused by the lack of funding, perceived status, job security and other incentives for researchers in Cambodia. They also mentioned the lack of policy support and Cambodia's underdeveloped national innovation system, which is not attractive to researchers.

Respondents had the following suggestions for the NRA to increase international research collaboration:

- Promote university networks with strong research collaboration;
- Create a supportive environment to assist visiting researchers, including adequate housing, environmental protection, high-quality education for their children, facilities and infrastructure to support their living;
- Provide monetary incentives to researchers;
- Ease regulations for working permits;
- Expand cooperation with international partners;
- Support research mentorship;
- Increase researcher mobility schemes and mid-career transition schemes.

In summary, there is not much support for international research collaborations, and there is a lack of clarity on what little is available.

## Academia-industry collaboration

### To what extent do research institutions and the private sector currently collaborate in Cambodia?

- Universities/research institutes

shows the extent to which each of the universities/research institutes collaborates with the private sector and whether they have a dedicated collaboration unit to, for instance, develop research contracts with the private sector or to commercialise research results.

While support facilities seem to exist in most institutions to allow for more industry collaborations, little collaboration is reported.

When asked how their institution communicated its research output to the private sector, responses included:

- One-off events: field trips, career days, training
- Seminars and conferences
- Social media
- Dedicated collaboration unit
- Via existing networks and alumni
- Via the university website

Only one institution (NPIC) had joint or open-access labs that professionals in the private sector could use. When asked if their research staff were incentivised to collaborate with the private sector, four institutions said they were “somewhat incentivised”, with paid consultancy work and extra project work. Three respondents were not incentivised, stating they were encouraged to collaborate with the private sector but without incentives. When asked how they thought the Government could better incentivise private sector collaborations, they had the following ideas:

- Develop policy and guidelines on consultancy work for researchers (as civil servants, they are not currently permitted to do consultancy work)
  - Allocate seed funds for collaborative research with the private sector
  - Provide motivation and encouragement mechanisms for researchers who successfully collaborate with the private sector, such as awards, prizes and tax breaks
  - Guarantee intellectual property
  - Develop an online platform for researchers, government and the private sector to collaborate and match needs with skills
  - Facilitate the application of research findings to industrial contexts
- Private sector

Private sector organisations were asked if they currently collaborated with universities and research institutes; MRG reported “collaborating somewhat” but all the other institutions did not collaborate. MRG reported collaborating with Invivo lab (Vietnam and France) and Chulalongkorn University (Thailand). When asked if research from universities and research institutes contributed to the needs of their organisation, three respondents said it somewhat contributed (SME, ARC, MRG); CCC reported that it did not contribute at all. When asked what actions the NRA should include to improve collaboration between academia and the private sector, they suggested setting up a focal point and facilitating cross-sector partnerships.

- Ministries

When asked if their ministry currently incentivises academia-industry collaboration, only four out of 11 ministries replied with “yes” (MFAIC, MEF, MOC, MPTC). When asked what the nature of the incentive was for universities and research institutes, one respondent at the MEF stated that they were incentivised with technical support, while another respondent at the same ministry said that: “To help SMEs access to technologies in their production, the Government incentivized [collaboration with] the tax incentive scheme which is stated in Sub-decree N° 124 dated 02 October 2018 on Tax Incentive for SMEs in the priority sectors; additionally, the Government also grants tax exemption for higher education institutions”. Meanwhile, MoC mentioned the incentive for capacity-building of officials, and MPTC reported funds for capacity-building or R&D.

When asked about the incentives for the private sector, the responses were similar: Technical support, income tax reduction, deductible expenses and non-financial incentives. Those who responded that there were no current incentives for collaboration attributed the absence of incentives to a lack of financial or other resources.

When asked about what the NRA should focus on to develop academia-industry collaboration further, the following ideas were provided:

- Build a concrete research policy and ecosystem for Cambodian researchers
- Ensure data protection: One reason for the hesitation in collaboration is the trust issue, and not having the same opinion on research ethics. Regulating research ethics and data protection will ensure that every institution will care equally about data privacy.
- Encourage the creation of Memorandums of Understanding and other collaboration mechanisms.
- Strengthen the quality of research institutions and higher education.
- Incentivise investors, such as angel investors or private equity funds, to invest in seed funding programs for research.
- Include a framework in the NRA on how to incentivise the collaboration between academia and business.
- Enhance coordination and exchanges between researchers with skills in demand.
- Support more dialogue between academia and private sector.

**Table C.5 Collaboration with the private sector, by academic institutions**

Institution	Extent of collaboration with private sector	Dedicated collaboration unit	Details
RUA	some	yes	Technology Transfer Office and Agriculture & Food Business Incubation Center
AVI	some	yes	Small unit to seek collaboration and partnership-building in research
NPIC	some	yes	International Relation Office and Research and Technology Development Center
RUPP	some	yes	Industrial Linkage Unit and Research Office
UHS	none	no	
ITC	n/a	yes	University-Industry Linkage office
CDRI	some	no	

Source: ESCAP Survey

In summary, not enough collaboration is occurring between researchers and industry. Although many institutions have dedicated units to facilitate such interactions, this does not translate sufficiently into actual collaboration. There are not enough incentives and the few that do exist suffer from a lack of clarity on how they function.

### Academic input for policy

#### To what extent is academic research used to inform policy?

- Ministries

Ministries were asked about the extent to which they engaged with various stakeholders in policymaking. Results are shown in table C.6. Ministries vary considerably in their degree of stakeholder consultations for policymaking. MISTI, MME, and MFAIC rely heavily on consultations with academia, whereas other ministries carry out little to no

stakeholder consultation. When asked what the main difficulties were in translating research into policy, the following responses were given:

- Lack of policy-impact pathways
- Lack of an NRA that brings together all stakeholders
- Policy and reform agendas are constantly changing
- Lack of technical skills to translate research into policy
- Lack of scientists in policymaking
- Lack of communication between policymakers and researchers

Recommendations for how the NRA should address the difficulties faced in translating research into policy were as follows:



- o Build researcher’s capacity
- o Provide a clear picture of priority sectors to guide research
- o Ensure policymaking is evidence-based
- o Provide a common goal and shared understanding for researchers, policymakers and other stakeholders
- o Set up a communications team and establish communication forums

**Table C.6 Influence of academic research to inform policymaking**

Ministry	Universities	Research institutes	Private sector	Civil society
MME	very	very	very	very
Mol	somewhat	somewhat	somewhat	somewhat
MFAIC	very	very	very	very
MoWRAM	not	not	not	not
MEF	somewhat	somewhat	somewhat / very	somewhat
MoC	not	somewhat / not	not	not
MISTI	very	very	very	somewhat
MoP	not	somewhat	not	not
MAFF	somewhat	somewhat	somewhat	somewhat
MoEYS	very	somewhat	somewhat	somewhat
MPTC	somewhat	somewhat	very	somewhat

Source: ESCAP Survey

## RESEARCH POLICY AND REGULATORY FRAMEWORKS

### All stakeholders

#### What research policy and regulatory frameworks exist? How could they be improved?

Four out of seven university respondents, eight out of 11 ministry respondents and two out of three private sector respondents were aware of the existing national-level policy and regulation frameworks to support research and innovation; however, they did not provide any further details. Recommendations for the Government to support and promote research activities included:

- Increase funding
- Give priority to Cambodian researchers over international researchers
- Promote researcher status within universities
- Promote revenue-generating research

- Establish research universities
- Have a governmental or institutional body responsible for managing, monitoring and evaluating research
- Tax incentives for R&D
- IP law protection
- Facilitate cooperative relationships between different research stakeholders
- Make financial procedures and management more flexible to better support research activities
- Invest in research infrastructure and human resources
- Train more researchers
- Provide access to documents and data

Among university respondents, three thought that the current IP law was “very much sufficient” to encourage

innovation in research, three thought it was only “somewhat sufficient” and one thought it was “not at all sufficient”. To improve IP law, respondents thought more events should be organised to encourage researchers to engage with the topic. One respondent thought the issue of IP law was more relevant to big firms than university researchers.

Among private-sector respondents, one thought IP law was “not at all sufficient” to encourage research innovation, two thought it was “somewhat sufficient” and one thought it was “very much sufficient”. Two respondents recommended better implementation of IP law to improve the situation.

Among the ministry respondents, nine out of 11 respondents thought IP law was “somewhat sufficient” and two thought it was “very much sufficient”. Recommendations included:

- Prioritize patents that deliver public benefits
- Attract more IP professionals to enforce IP law
- Increase dissemination of IP law to public and private sectors
- Support private sector access to patents
- Support the private sector on tech-scouting and tech-transfer activities
- Support start-ups and SMEs on IP applications
- Increase stakeholder engagement in the IP system
- Establish IP units within universities
- Offer free registration of patents to academic applicants
- Speeding up the patent evaluation process
- Building capacity of IP unit to perform mock patent evaluations
- Update the national IP law and harmonise with international IP laws

