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and Pacific Centre for Transfer of Technology**

Evaluation of the Asian and Pacific Centre for Transfer of Technology (APCTT)

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Evaluation of the Asian and Pacific Centre for Transfer of Technology (APCTT)

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Evaluation of the
Asian and Pacific Centre
for Transfer of Technology (APCTT)

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Prepared by

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List of Acronyms

APCICT	Asian and Pacific Centre for Information and Communication Technology for Development
APCTT	Asian and Pacific Centre for Transfer of Technology
CAPSA	Centre for the Alleviation of Poverty through Sustainable Agriculture
CII	Confederation of Indian Industry
CSAM	Centre for Sustainable Agricultural Mechanization
CSIR-HRDC	Council of Scientific and Industrial Research - Human Resource and Development Center
DESA	Department of Economic and Social Affairs
DSIR	Department of Scientific and Industrial Research
ESCAP M&E	ESCAP Monitoring and Evaluation
FIEO	Federation of Indian Export Organizations
GC	Governing Council
GOI	Government of India
GS	General Staff
ICT	Information and Communications Technology
IIT Delhi	Indian Institute of Technology Delhi
IoT	Internet of Things
MDG	Millennium Development Goals
NIS	National Innovation System
NRDC	National Research Development Corporation
PICT	Pacific Island Countries and Territories
PIFS	Pacific Islands Forum Secretariat
R&D	Research and Development
RECAP	Renewable Energy Cooperation-Network for the Asia Pacific

List of Acronyms

RET	Renewable Energy Technology
SAARC	South Asian Association for Regional Cooperation
SATNET Asia	Sustainable Agricultural Technologies and Improved Market Linkages in South and Southeast Asia
SDG	Sustainable Development Goal
SIAP	Statistical Institute for Asia and the Pacific
SIDS	Small Island Developing States
SME	Small- and Medium-Scale Enterprises
SPREP	Secretariat of the Pacific Regional Environment Programme
SRO	Subregional Office
STEPI	Science and Technology Policy Institute
STI	Science, Technology and Innovation
STIPI	Science, Technology and Innovation Policy Institute
TOR	Terms of Reference
UNDA	United Nations Development Account
UN DESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEG	United Nations Evaluation Group
UNESCAP	UN Economic and Social Commission for Asia and the Pacific
UN OCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNESCAP SPMD	UNESCAP Strategy and Programme Management Division
UNESCAP TIID	UNESCAP Trade, Industry and Innovation Division
UNESCAP RO	UNESCAP Regional Office
UN SSWA	UN Subregional Office for South and South-West Asia
WEF	World Economic Forum
WISE	World Institute of Sustainable Energy

Introduction

This is the evaluation report which has reviewed the performance of the Asian and Pacific Centre for Transfer of Technology (APCTT), a regional institution of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). It was established in 1977 and is headquartered in New Delhi with host facilities provided by the Government of India. The activities of APCTT are focused on three specific areas: science, technology and innovation policy, technology transfer, and technology intelligence. This evaluation was conducted by Dr. F. A. Uriarte, Jr., a former Secretary (Minister) of Science and Technology, Republic of the Philippines, and was conducted between July and December 2018 in New Delhi, India, in Bangkok, Thailand, and in Metro Manila, Philippines.

Purpose and Scope

The evaluation aims to contribute to the overall effectiveness of ESCAP in line with Commission resolutions 66/15 and 71/1 and generate information on its achievements and results under the programme of work of APCTT. It focuses on providing recommendations to ESCAP's management and the Commission on how to improve the substantive relevance and financial viability of APCTT in the context of the ongoing reform process at ESCAP and the 2030 Agenda for Sustainable Development. The specific objectives are:

- To assess the substantive relevance of APCTT's mandate in the context of the ongoing reform of ESCAP and 2030 Agenda for Sustainable Development; sustainability of APCTT in terms of its financial and the level of human resources; and results and efficiency of APCTT's delivery of its capacity building activities.

- To recommend specific actions for improving the results-orientation, relevance, sustainability and efficiency of APCTT.

Methodology

The evaluation made use of the following methods of information and data collection and analysis and which were triangulated for purposes of evaluation:

- **Desk review of relevant documents**

- **Consultations with relevant government officials and other stakeholders of the host country.** Consultations were conducted on 9-11 October 2018

- **Consultations with relevant APCTT and ESCAP secretariat staff and Reference Group**

- **Stakeholder Interviews during Regional Forum of Strategies to Enhance Innovation and Management Capacities of SMEs.** During this forum in Manila, Philippines on 18-19 July 2018, consultations were conducted with the APCTT Head and staff

- **Stakeholder Interviews during the APCTT Regional Workshop on Achieving Sustainable Development Goals through STI Sectoral Interventions.** During this workshop in Bangkok, Thailand on 26-29 August 2018, interviews were conducted among some APCTT Governing Council members, relevant government representatives, ESCAP secretariat staff, and other stakeholders

- **Evaluation survey**

Conclusions

Based on the findings of this study, it is concluded that the mandate of the APCTT remains relevant in the context of the ongoing reform of ESCAP and the 2030 Agenda for Sustainable Development. It is also evident that majority favors keeping APCTT at its current location in New Delhi. Furthermore, APCTT is able to deliver its capacity building activities efficiently despite the current limited financial and human resources. However, it is also concluded that under the current severe financial and human resource limitations, the effective operations of the APCTT cannot be sustained in the future.

These conclusions are supported by ample information derived from the comprehensive desk review of relevant documents, and consultations, interviews, and survey of representatives of member countries, ESCAP secretariat staff, and relevant national, regional and international organizations. These conclusions are also consistent with the statements and recommendations made at the Second Meeting of the Committee on ICT STI in August 2018.

Relevance. The findings of this study show the substantive relevance of APCTT's mandate in the context of the ongoing reform of ESCAP and 2030 Agenda for Sustainable Development. Indeed the Second Meeting of the ESCAP Committee on ICT STI in August 2018 expressed "the opinion that the mandate and the work of the Asian and Pacific Centre for Transfer of Technology is crucial and relevant to the implementation of the 2030 Agenda." The survey of member countries and relevant staff of the ESCAP secretariat also confirms this conclusion. Furthermore, the document review and stakeholder consultations show that a number of member countries find the APCTT activities useful and have made some impact and benefitted them in strengthening national innovation systems and in formulating STI policies, among others. However, it is evident that the Centre's capacity to deliver substantive capacity building activities has been severely constrained by the limited staffing structure and funding. It is concluded the impact and benefits that the Centre provides to the countries have also been constrained.

Sustainability. Although there are views to the contrary, the findings of this study show that the APCTT is not sustainable in terms of the current level of its financial and human resources. Indeed the Second Meeting of the ESCAP Committee on ICT STI in August 2018 expressed "the concern that the current human resources and financial capacities of the Asian and Pacific Centre for Transfer of Technology are not satisfactory in terms of carrying out mandated

activities and meeting the growing demand for the Centre's activities." The survey of member countries and the relevant ESCAP secretariat staff show contrasting results; but consultations with various government agencies of the host country and with representatives of some member countries confirm the conclusion that at its present level of funding and staffing, the Centre is not sustainable in the long run.

Efficiency. The findings of this study show the efficiency of APCTT's delivery of its capacity building activities. This conclusion is reflected in the recommendation of the Second Meeting of the ESCAP Committee on ICT STI held in August 2018 to continue "the current work of the Asian and Pacific Centre for Transfer of Technology in addition to the emerging areas on information and communications technology (ICT), big data, artificial intelligence and the Internet of things." This conclusion is supported by the results of the survey of member countries and relevant ESCAP secretariat staff as well as the results of the survey of national and regional organizations that have worked with the Centre. It is also consistent with the results of the interviews and consultations.

Recommendations

Based on the key findings and conclusions of the evaluation this study proposes six recommendations for improving the results-orientation, relevance, sustainability and efficiency of APCTT.

> **Recommendation 1**: **APCTT should remain at its present location provided that the host government commits to increase its financial contribution to the Centre, over an agreed period, to a level comparable to that contributed by governments hosting other ESCAP regional institutions.**

It is evident from the findings of the study that the host government is still very much interested in keeping the Centre in New Delhi and that it is willing to consider enhancing its annual contributions to the Centre. Increases in annual contribution may be made in several phases over an agreed reasonable period of time. For example, over a period of four years planned increases may be made starting from US$500,000 during the initial phase (representing an increase of US$300,000 from the current level of about US$200,000) and gradually increasing to the same level of contributions of the host governments of other ESCAP regional institutions, which range approximately from US$1.0 million to US$ 1.5 million annually. If increased host country funding is not forthcoming, other options should be explored.

> **Recommendation 2**: **Renegotiate the Host Country Agreement to allow the use of funds from India to recruit international staff through a formal amendment or an exchange of letters, or hold the provision of Article XIII, 1(d) in abeyance through an exchange of letters, whichever is more expedient, to enable the immediate use of host government contribution for the salaries and allowances of internationally-recruited staff.**

Under the present Host Country Agreement, the financial contributions from the Government of India cannot be used for salaries and allowances of internationally-recruited staff. Thus even if the host government is able to provide additional financial resources, it may not be possible to recruit international staff. Accordingly, there will be need to review and renegotiate this Agreement. However, this process may take time. Since it was felt during the consultations with representatives of the host government that there was mutual desire on the part of both the ESCAP secretariat and the Host Government to strengthen the APCTT the soonest possible time, the idea of merely exchanging letters to either amend or temporarily suspend the provision of Article XIII, 1(d) was floated with no discernable objections at the meeting with the Department of Scientific and Industrial Research of the Ministry of Science and Technology, the focal point and the host ministry of APCTT. If either option is possible within the legal framework of the host government, this recommendation should be immediately explored and implemented.

> **Recommendation 3**: **Pursue vigorously the implementation of the 2009 Governing Council decision urging member States to increase institutional support to an annual contribution of US$30,000 from developing countries and US$7,000 from least developed countries to enable the Centre to deliver effective services to members and associate members on a sustainable basis.**

This 2009 Governing Council decision is basically a reiteration of the late 1990s decision of the Governing Council. Both decisions have remained largely unimplemented. The APCTT, together with the ESCAP secretariat, should pursue vigorously the implementation of this decision, regularly reminding member countries concerning this decision. And taking into consideration the huge demand for the services of the APCTT from member countries, it is possible that the increased contribution from the host government may spur other member countries to start contributing or increasing their contributions in line with the 2009 GC decision.

> **Recommendation 4**: **Strengthen the APCTT by providing it with additional professional staff comprising one P5, one P4, one P3, and the corresponding technical and support staff.**

Once sufficient financial resources become available from the host government, the number of professional staff may be increased following the CSAM model to comprise one P5, one P4 and one P3, and the corresponding technical support staff, which may comprise 2 G7, 2 G6, 2 G5, and 1 G2 in order to enable APCTT to become more relevant, sustainable and efficient. The possibility of having NRLs and consultants should also be taken into consideration.

> **Recommendation 5**: **Endeavor to develop robust multi-stakeholder partnerships and meaningful engagement with the private and non-government sectors through, among others, linkages and cooperation with various technology transfer networks.**

It is a well-known fact that most technologies and patents are owned or are in the hands of the private sector. The relevance and impact of APCTT may be further enhanced by

developing meaningful engagements with the private sector. One way of attaining this is through linkages and cooperation with various technology transfer networks. There are a number of networks involved in technology transfer. Some examples are: International Technology Transfer Network, founded in 2011 and based in Beijing, China, promotes international technology transfer and innovation cooperation through long-term partnerships with more than 200 international technology transfer organizations in 15 countries. Association of European Science and Technology Transfer Professionals, created in 1999 and based in The Hague, in the Netherlands, promotes technology and knowledge transfer between European scientists and industries from around the world and has more than 500 members over 35 countries. Alliance of Technology Transfer Professionals has 11 knowledge and technology transfer associations including: *Association of European Science and Technology Transfer Professionals, Association of University Technology Managers, International Strategic Technology Alliance, Swedish Network for Innovation and Technology Transfer Support, Society for Technology Management, University Network for Innovation and Technology Transfer, and others.*

> **Recommendation 6**: **Give greater focus in the APCTT work programme to the transfer, dissemination and diffusion of emerging and environmentally sound technologies to developing countries on favorable terms in delivering capacity development and technical cooperation work.**

The work programme focus of APCTT in the 3 strategic areas of science, technology and innovation, technology transfer, and technology intelligence is generally aligned with the 2030 Agenda for Sustainable Development. It may be further strengthened and better aligned with the SDGs, in particular with SDG9 and SDG17, by giving greater focus to the transfer, dissemination and diffusion of emerging and environmentally sound technologies to developing countries on favorable terms in delivering capacity development and technical cooperation work. This may be further developed based on APCTT's current work in renewable energy and sustainable agriculture technologies, which are among the important environmentally sound technologies needed by developing countries. Once sufficient financial and manpower resources become available, APCTT should consider including in its suite of activities the various recommendations made by member States, in particular those suggested at the Second Meeting of the ESCAP Committee on ICT STI held in August 2018, which include, among others, emerging areas of information and communications technology, big data, artificial intelligence, and the Internet of Things as well as water-related technologies. Activities may include not only capacity building but also, among others, enhanced knowledge sharing and partnerships, exchange of experts and S&T staff, and networking of start-ups.

1. INTRODUCTION

1.1 Background of the Evaluation

This is the evaluation report which has reviewed the performance of the Asian and Pacific Centre for Transfer of Technology (APCTT). APCTT is a regional institution of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) servicing the Asia-Pacific region. It was established in 1977 with the objective of strengthening capacity of member States to develop and manage national innovation systems; develop, transfer, adapt and apply technology; improve the terms of transfer of technology; and identify and promote the development and transfer of technologies relevant to the Asia-Pacific region. The Centre is headquartered in New Delhi with host facilities provided by the Government of India. The activities of APCTT are focused on three specific areas: science, technology and innovation policy, technology transfer, and technology intelligence. The current emphasis is on new and emerging technologies such as renewable energy, biotechnology, nanotechnology, ICT and Internet of Things (IoT) which have high growth potential and can address the collective challenges of the region.

This evaluation was conducted by Dr. F. A. Uriarte, Jr., an independent consultant based in the Philippines, an academician of the National Academy of Science and Technology, and former Secretary (Minister) of Science and Technology, Republic of the Philippines, and also former Director, Information, Communications and Space Technology Division, UNESCAP. This evaluation was conducted between July and December 2018 in New Delhi, India, in Bangkok, Thailand, and in Metro Manila, Philippines.

1.2 Purpose, Objectives and Scope

The evaluation aims to contribute to the overall effectiveness of ESCAP in line with Commission resolutions 66/15 and 71/1 and generate information on its achievements and results under the programme of work of APCTT. The evaluation is also forward looking, with a focus on providing recommendations to ESCAP's management and the Commission on how to improve the substantive relevance and financial viability of APCTT in the context of the ongoing reform process at ESCAP and the 2030 Agenda for Sustainable Development. In order to maximize its usefulness, it is designed to contribute to ongoing reform initiatives of ESCAP generally and of the APCTT in particular and conducted in line with the ESCAP Monitoring and Evaluation Policy and Guidelines[1].

The specific objectives are:

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[1]Available on the ESCAP webpage at http://www.unescap.org/partners/monitoring-and-evaluation/evaluation

- To assess the substantive relevance of APCTT's mandate in the context of the ongoing reform of ESCAP and 2030 Agenda for Sustainable Development; sustainability of APCTT in terms of its financial and the level of human resources; and results and efficiency of APCTT's delivery of its capacity building activities.

- To recommend specific actions for improving the results-orientation, relevance, sustainability and efficiency of APCTT.

1.3 Object of Evaluation and Description

The target users of the evaluation results include the UN General Assembly, Development Account Fund Manager at DESA, ESCAP management and staff, ESCAP member States, APCTT Governing Council, management and staff, and other stakeholders of the Centre. The final deliverables of the evaluation are:

- Evaluation Report (following the structure presented in the Annex to the Terms of Reference);

- Evaluation Brief (two-page summary of the evaluation report); and

- PowerPoint presentation on the key findings, conclusions and recommendations.

2. METHODOLOGY

2.1 Description of Methodology

The scope of the evaluation sought to analyze and evaluate the performance of the Centre against three key parameters: relevance, sustainability, and efficiency.

Evaluation criteria	Evaluation questions
Relevance Assesses the relevance of the Centre's objectives and outputs in the context of 2030 Agenda for Sustainable Development and in line with the priorities and requirements of the member States.	• What evidences exist that the Centre's outputs were designed and delivered in line with the needs of the member States? • What were the overall results & achievements of APCTT over the past two biennia? What indicators should be used for measuring these results? • Which countries have benefited the most from APCTT's outputs? • Which APCTT outputs were most beneficial to the countries? Which outputs need to be discontinued? • What adjustments have been made and needed to be made to the work programme of APCTT to better align with the 2030 Agenda for Sustainable Development?
Sustainability Assess the short, medium and long-term sustainability of the Centre	• What is the desired level of human and financial resources required to make APCTT more relevant and sustainable? • What is the level of financial commitments from the host government and other member States expected over the next five years? • What is the resource gap to operate APCTT at the desirable level? • What could be done to fill the gap? What other sources of funds should be explored by APCTT?
Efficiency Assesses the extent to which human and financial resources were used in the best possible way to deliver activities and outputs, in coordination with other stakeholders	• What measures could be in place to improve cost efficiency in delivering APCTT outputs? • To what extent were in-kind contributions from the host government, other member States and partner organizations sought and received to supplement APCTT resources? • To what extent did APCTT coordinate and cooperate with TIID and other substantive divisions of ESCAP in the design and delivery of its outputs? How can the coordination and cooperation be enhanced?

Based on these key parameters, the evaluation questions were developed. These evaluation questions were posed to APCTT Governing Council and Focal Points, selected member States, relevant ESCAP secretariat staff, and stakeholders who were able to take part in this assessment. They were also internally posed by the evaluator when assessing relevant outputs and survey results undertaken in conjunction with this project.

2.2 Data Collection and Analysis

The evaluation made use of the following methods of information and data collection and analysis and which were triangulated for purposes of evaluation:

- **Desk review of relevant documents**
  A desk review of relevant documents and reports was made including, among others, the documents and reports listed in **Annex C**.

- **Consultations with relevant government officials and other stakeholders of the host country**
  Consultations with relevant government officials and stakeholders of the host country, including in particular the Minister of Science and Technology, the Joint Secretary of the Department of Commerce, Ministry of Commerce and Industry, the Chairman and Managing Director and senior officials of the National Research and Development Cooperation, and the senior officials of the Department of Scientific and Industrial Research (DSIR), were conducted on 9-11 October 2018 to ascertain the support to APCTT by the Government of India. Other stakeholders include Confederation of Indian Industry, Federation of Indian Export Organizations and others.

- **Consultations with relevant APCTT and ESCAP secretariat staff and Reference Group**
  Consultations with relevant APCTT and ESCAP secretariat staff and members of the Reference Group were conducted to get a better understanding of the different aspects of the project including its design and implementation and provide a useful basis for collecting other relevant data.

- **Stakeholder Interviews during the Regional Forum of Strategies to Enhance Innovation and Management Capacities of SMEs**
  During the Regional Forum of Strategies to Enhance Innovation and Management Capacities of SMEs held in Manila, Philippines on 18-19 July 2018, consultations were conducted with the APCTT Head and staff.

- **Stakeholder Interviews during the APCTT Regional Workshop on Achieving Sustainable Development Goals through STI Sectoral Interventions**

During the APCTT Regional Workshop on Achieving Sustainable Development Goals through STI Sectoral Interventions to be held in Bangkok, Thailand on 26-29 August 2018, interviews were conducted among some APCTT Governing Council members, relevant government representatives, ESCAP secretariat staff, and other stakeholders.

- **Evaluation survey**

  An evaluation survey was conducted to solicit the opinion of relevant individuals who had participated or engaged in various APCTT activities to help assess the performance of the Centre. The survey questionnaires are shown in *Annex D* and the list of survey respondents in *Annex E*.

2.3 Limitations

The success of the evaluation was contingent on the support and cooperation of the various informants and stakeholders during the conduct of the survey and interviews. Given budget limitations for the evaluation, it was not feasible to conduct face-to-face interviews with the wider stakeholder group in each country. Thus an e-mail survey was undertaken to gather feedback from the broader constituency of the stakeholders involved.

Phone interviews

Due to budget and time constraints, face-to-face interviews with all country project participants were not possible. Some interviews were conducted through Skype or telephone. While not in all cases, it was found that this interview was not as effective as face-to-face interviews in obtaining information particularly when it came to having in-depth discussions on the subject matter. Nevertheless, the difference in effectiveness is marginal, and on the whole the most useful information were successfully gathered.

Lack of field visits

Also due to budget and time constraints, visits to relevant country counterparts and their organizations were not undertaken, except for some organizations in the host country. The field visits would have allowed a broader group of stakeholders to be approached and spoken to, allowing a broader diversity of views. However, the evaluator feels that this would not have made much difference in terms of the overall findings, conclusions, and recommendations.

3. FINDINGS

3.1 Overview

The findings of this study are the results of three processes: (a) comprehensive review of relevant reports, documents and publications; (b) survey of various stakeholders from member countries, ESCAP secretariat, and national, regional and international organizations; and (c) consultations with concerned agencies and organizations in the host country, and with selected staff of the ESCAP secretariat staff and representatives of member countries.

The APCTT is a United Nations Regional Institution under ESCAP. It was established in 1977 in Bangalore, India, but in 1993, the Centre moved to New Delhi with host facilities provided by the Government of India.

As per the revised statute of APCTT adopted by the 72nd session of ESCAP held in 2016[2], the objectives of the Centre are to assist the members and associate members of ESCAP through strengthening their capabilities to: 1) develop and manage national innovation systems; 2) develop, transfer, adapt and apply technology; 3) improve the terms of transfer of technology; and 4) identify and promote the development and transfer of technologies relevant to the region.

The APCTT is governed by a Governing Council consisting of a representative designated by the Government of India which extends host facility to the Centre, and no fewer than eight representatives nominated by other members and associate members of ESCAP elected by the Commission for a period of three years. The Governing Council meets at least once a year, advises on the formulation and implementation of the programme of work and reviews the administration and financial status of the Centre. The Executive Secretary submits an annual report, as adopted by the Governing Council, to ESCAP at its annual sessions. APCTT reports its activities to the ESCAP Committee on Information and Communications Technology & Science, Technology and Innovation. The Advisory Committee of Permanent Representatives and Other Representatives Designated by Members of ESCAP periodically reviews the work of APCTT. The Governing Council elected for the tenure of three years (2017-2020) comprises of the following 13 member States: Bangladesh, China, Fiji, India, Indonesia, Islamic Republic of Iran, Kazakhstan, Malaysia, Pakistan, Philippines, Republic of Korea, Sri Lanka and Thailand.

The APCTT has the following functions: (a) Research and analysis of trends, conditions and opportunities; (b) Advisory services; (c) Dissemination of information and good practices; (d)

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[2] Resolution adopted by the Economic and Social Commission for Asia and the Pacific 72/3, Statute of the Asia and Pacific Centre for Transfer of Technology (E/ESCAP/RES/72/3) dated 19 May 2016.

Networking and partnership with international organizations and key stakeholders; (e) Training on national personnel, particularly national scientists and policy analysts.[3] As per APCTT's Strategic Plan (2013-2017), the APCTT covers three focus areas: (a) science, technology and innovation; (b) technology transfer; and (c) technology intelligence.

The APCTT is a small organization comprising the Head (P5)[4] and two G6 staff who carry out substantive activities. APCTT has three full time support staff: 1 G6 Programme Associate (vacant), 1 G5 Staff Assistant and 1 G4 Team Assistant. Staff carrying out administrative work are jointly financed by ESCAP Sub-regional office for South and South-West Asia (SRO-SSWA) for cost saving purposes. They are: 1 G6 Administrative Assistant, 1 G5 Information Technology Assistant and 1 G2 Driver. Due to budget constraints, APCTT was not allowed to recruit two staff members against three vacant posts in 2017 and 2018. These were 1 G6 staff (research assistant) and 1 G5 staff Programme Assistant at Administration.

The Centre has been increasingly facing human resources and financial constraints, not only in implementing its substantive programmes and activities but also in meeting the institutional and local operating costs. The Centre has been delivering capacity-building activities with its severely limited human resources till now (***Table 3.1***). Given the significant increase of the local GS and contractual services (e.g., security guards, cleaners) salaries, there is a serious concern for the Centre's financial sustainability. In comparison, there have been numerous recommendations and requests from member countries for the delivery of various capacity-building, technology transfer and other technical services.

Table 3.1. APCTT Capacity-building Activities[5]

GC Report	Activities
10th session, 2014 (Dec 2013 – Nov 2014)	Conducted 32[6] capacity-building activities in 13 member States with the involvement of 18 countries working together with 22 partner institutions.
11th session, 2015 (Dec 2014 – Nov 2015)	Held 13 capacity-building programmes in 12 member States in close collaboration and partnership with 22 partner institutions.
12th session, 2016 (Dec 2015 – Nov 2016)	Delivered and/or actively contributed in 14 capacity-building activities in 9 member countries in close cooperation and partnership with 21 partner institutions.

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[3] Extracts from E/ESCAP/RES/72/3

[4] As of 1 January 2018, the P5 (Head of Office, RB) post was redeployed to the Energy division. Currently the Head, APCTT is on loan from the ESCAP regular budget. From 1 January to 31 October 2018, the APCTT Head was on loan from the ESCAP regular budget. As the post was returned to the Energy Division, ESCAP Subregional Office for South and Southeast Asia is currently providing its P5 officer as the Officer-in-Charge of APCTT.

[5] Based on APCTT activity reports submitted to the relevant Governing Council sessions.

[6] Higher number of activities conducted during the period was due to additional financial resources received through extra-budgetary financed projects.

13th session, 2017 (Dec 2016 – Nov 2017)	Delivered and/or participated in 15 capacity building activities in 6 member countries in collaboration with 27 partner institutions.
14th session, 2018 - Ongoing (Nov 2017 – 3 Nov 2018)	Delivered and/or contributed in 12 capacity building activities in 7 member countries in close collaboration with 16 partner institutions.

It has been suggested that the Government of India could consider enhancing its annual contribution to the Centre to cover its operating costs. In a 2009 decision of the Governing Council, members and associate members are urged to increase institutional support to an annual contribution of US$30,000 from developing countries and US$7,000 from least developed countries or above, to enable the Centre to deliver effective services to members and associate members on a sustainable basis. This is almost similar to a much earlier recommendation of the Centre's Governing Board in the late 1990s asking developing and least developed member countries to make an annual contribution of US$20,000 and US$5,000, respectively.

The average total contribution to the Centre during the past six years is only US$391,341 of which 50% is contributed by the host country, India (*Table 3.2*). This level of contribution received from the host country is very much lower than the contributions to other ESCAP regional institutions. For example, in 2017, APCTT received a contribution from the host country for the amount of $198,500 while hosts of other Regional Institutions contributed US$1,575,458 for APCICT, US$1,783,700 for SIAP and US$1,720,000 for CSAM in 2017. APCTT received voluntary contributions from 12 countries, while APCICT received from 3 countries, CSAM from 10 countries, and SIAP from 28 countries. Total contribution to APCTT in 2017 was only US$451,436 compared to US$1,582,458 for APCICT, US$2,359,348 for SIAP, and US$2,083,510 for CSAM.

Table 3.2. Annual Contributions to APCTT (US$)

Year	Total	India	Percentage of Indian Contribution
2012	204,709	0	0
2013	599,737	410,806	68.5
2014	237,228	0	0
2015	509,618	363,668	71.4
2016	345,329	203,028	58.8
2017	451,426	198,588	44.0
Average	**391,341**	**196,015**	**50.0**

Source: GC Annual Reports

The problem of inadequate funding has haunted APCTT for many years. In order to cope with inflation and increased costs of the Centre, the APCTT implemented a series of cost-cutting measures in the past thirteen years, which included the reduction of its locally recruited full-time staff numbers from 14 to 7. Currently the Centre has only 4 full time locally recruited staff and 1.5 common administrative service staff (3 staff, shared with SRO-SSWA). However, there is still one vacant post which has still not been filled. The financial contribution from the host country for institutional support has remained static since 2004. It is evident that the Centre's capacity to deliver substantive programme activities has been severely constrained by the shortage of staff. In the 2018-2019 budget, approved by the General Assembly, the P5 post of APCTT was redeployed as per resolution 71/1, which called for the regional institutes to be primarily funded through XB resources. Regular budget P5 posts of CSAM and CAPSA were also redeployed. Subregional Office for South and Southwest Asia (SRO-SSWA) is currently providing officer-in-charge of APCTT (P5).

These findings are more fully elaborated in **Annex F**.

The Strategy and Programme Management Division (SPMD) of ESCAP has prepared a comprehensive presentation on *APCTT Institutional Support Funds,* [7] which provides a summary of financial issues, viz:

- Host country contributions have not increased to meet operational costs.
- Reserves in the host country trust fund are depleted. Host country trust fund can only support about one more year of GS staff salaries and office operations costs.
- Multi-donor trust fund has built up reserves. Enhanced contribution from the Philippines, ROK and Vietnam have been received in recent years. Spending against multi-donor trust fund is limited due to a number of constraints.
- Fund balances of technical cooperation projects are earmarked and cannot be considered as reserve funds.
- Annual contributions from the multi-donor trust fund are insufficient to sustainably cover costs of recruiting professional staff.

It also identifies the key issues that need to be addressed, viz:

- Increase in annual host country funding to not only cover the current operating deficits but also provide funds for recruitment of core professional staff to strengthen APCTT capacities to meet member States needs to address the 2030 Agenda and required contingency reserves.
- Revision of the host country agreement is needed to enable the use of host country funds to cover costs of professional staff.

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[7] A staff of ESCAP gave this presentation during the meetings in October 2018 with senior officials of the Government of India, particularly, the DSIR and the Department of Commerce.

- The post of the Head of APCTT was on loan from the ESCAP regular budget from 1 January-31 October 2018. As of 1 November 2018, SRO-SSWA provides the officer-in-charge of APCTT (P5).
- A proposal for enhanced funding was submitted and need approval to ensure the substantive and financial viability of the Centre.

A copy of the SPMD presentation is given in **Annex I.**

Key Outcomes and Accomplishments

Member States have cited the accomplishments of the Centre that have been useful or have made some impact in their respective countries. A few are summarized below.[8]

Malaysia. Over the years, many countries have benefitted from APCTT's regional programmes in strengthening national and sectoral innovation systems through sharing of international best practices and leveraging on the expert network for technology transfer.

Philippines. APCTT's programs have been helpful to the Philippines in formulating STI policies and strengthening the country's national innovation system. APCTT's regional consultations, expert group meetings and capacity building programmes enabled the country to learn new insights, tools and methodologies to develop national STI capacities particularly in new and emerging technological sectors such as renewable energy, climate resilient agriculture, and nanotechnology.

Islamic Republic of Iran. Iran has benefitted from the regional cooperation and capacity building activities delivered by APCTT during the past several years … focusing on nanotechnology, R&D management and technology-based entrepreneurship.

Sri Lanka. APCTT's regional platforms such as Technology4SME, Renewable Energy Cooperation Network for Asia-Pacific, and Asia-Pacific Nanotechnology R&D Management Network have been very helpful for Sri Lankan SMEs, researchers and institutions involved in STI, under the Ministry of Science, Technology and Research. These initiatives of APCTT helped them in getting access to information on technologies, best practices and experiences from the region in new and emerging technologies.

Thailand. It is obviously shown how well and how fruitful APCTT, TISTR and MOST Thailand work together to strengthen capacity building of Asia-Pacific and ASEAN

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[8] Excerpts quoted from the statements of member States at the Second Session of the ESCAP Committee on ICT STI held in Bangkok, Thailand in August 2018.

regions member States and to support Sustainable Development Goals in the aspect of renewable energy.

Republic of Korea. APCTT's capacity building programmes involving experts from the Science and Technology Policy Institute, Korea Technology Finance Corporation, Korea Institute of S&T Evaluation and Planning as well as KAIST helped those experts to share best practices and effective implementation of STI policies and to learn about technology transfer scenarios in other countries. Republic of Korea sees that the mandate and work programme of APCTT are relevant to the needs of the Asian and Pacific region.

Japan. Japan recognizes the activities and mandates of APCTT as unique and useful for member States of ESCAP as APCTT being the only organization within ESCAP secretariat that deals with key STI policy, including on R&D, national innovation system, and capacity building in those areas.

Fiji. APCTT's online platforms for regional cooperation in new and emerging technologies are valuable tools for member countries to learn, network and partner with institutions in other countries.

India. APCTT helped member States namely India, Thailand, Cambodia, Indonesia, Japan, Lao PDR, Nepal, Brunei Darussalam, Malaysia, Myanmar, Philippines, Viet Nam and China in strengthening their renewable energy policy through demand-driven activities. Lao PDR and Indonesia were supported in developing national strategy reports to strengthen enabling environment and technology innovation ecosystem for affordable sustainable energy. APCTT has helped enhancing technology transfer capabilities of over 3000 stakeholders through demand-driven training programmes in member countries. The capacity building activities benefited participants from India, China, Singapore, Bangladesh, Sri Lanka, Malaysia, Indonesia, Islamic Republic of Iran, Kazakhstan, Pakistan, Philippines, Republic of Korea. APCTT contributed to the blueprint for the International Solar Alliance and its subsequent establishment in India as an international, intergovernmental organization.

The key outcomes of APCTT, including some specific examples, may be summarized as follows:[9]

- Regional technology cooperation of member countries enhanced
- National innovation systems strengthened
- Sectoral innovation systems promoted in nanotechnology, renewable energy, biotechnology, and sustainable agricultural technologies

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[9] Taken from the report *APCTT Achievements (2014-2018).*

- Technology transfer capacity increased; and
- Technology intelligence of stakeholders enhanced.

In partnership with the National Institute of Plant Health Management, India, APCTT established the first ever biological control unit in Bhutan to enable Bhutan to locally manufacture biological pesticides as part of its organic agriculture roadmap.

APCTT's policy recommendation to the Philippines to consider expansion of mandate of the Department of Science and Technology to include agro-enterprise in their portfolio was accepted by the government and the scope of DOST was expanded to include agro-enterprises in DOST-supported schemes and programmes.

APCTT facilitated the establishment of a tripartite programme on nanoparticle characterization comparison on nanoparticle size activity between Iran, Thailand and Taiwan province of China under the aegis of Asia Nano Forum.

APCTT helped farmers' federation with a membership of 3,000 smallholder farmers in South India to facilitate export of bananas to China, the Islamic Republic of Iran and Malaysia.

APCTT transferred 59 elite mung bean lines with pest and disease resistance through the World Vegetable Centre to help farmers in Myanmar mitigate the effects of climate change.

3.2 Performance Assessment

In this section, we assess the performance of APCTT in terms of the three key evaluation criteria, namely, relevance, sustainability, and efficiency.

3.2.1 Desk review of relevant documents

The comprehensive review of relevant papers, reports and documents provide valuable answers to the evaluation questions contained in this study's Terms of Reference. They also give clear indications concerning the Centre's relevance, sustainability and efficiency. The answers to the evaluation questions are presented fully in *Annex G* and briefly discussed below.

Relevance

1. **What evidences exist that the Centre's outputs were designed and delivered in line with the needs of the member States?**

The statements of commendation, strong support, and endorsement made by member States during meetings of the Governing Council of APCTT and its former Technical Committee provide evidence that on the whole the Centre's outputs were designed and delivered in line with the needs of the respective member States. In addition, the Governing Council of the APCCT, which is composed of representatives of 13 member States, discusses concrete project proposals and endorses the programme of work of APCTT every year at its annual session. During meetings of the Centre's Governing Council, member States invites APCTT to conduct concrete activities at their own countries on specific topics based on their needs. APCTT gives priority to activities that are proposed and supported by several countries at the GC session, subject to availability of funds. Accordingly, the projects may be presumed to be in line with the member States' priorities and needs and designed and delivered accordingly. Otherwise the member States and/or the Governing Council would have taken the Centre to task rather than make statements of commendation. Finally, the positive and supportive statements made by member countries during the Second Meeting of the Committee on ICT STI in August 2018 provide unequivocal evidence that the Centre's outputs are designed and delivered in line with the needs of member States.[10]

2. **What were the overall results and achievements of APCTT over the past two biennia? What indicators should be used for measuring these results?**

The report on *APCTT Achievements (2014-2018)* provides detailed information on the overall results and achievements of APCTT over the past two biennia and gives some indication on the kind of indicators to be used for measuring these results.[11]

During the period 2014 - July 2018, APCTT trained over 5,581 stakeholders from 18 countries in the Asia Pacific Region. In Science, Technology and Innovation (STI), a total of 3,951 participants including policy makers were trained on formulating and implementing policies and programmes in science, technology and innovation (STI), national innovation systems (NIS), techno-entrepreneurship and technology transfer. In new and emerging technologies, climate resilient agriculture, renewable energy and nanotechnology, a total of 1,630 participants participated and benefitted from various regional cooperation programmes organized by APCTT with a specific focus on sharing experiences, best practices and technologies among countries in the Asia-Pacific region.

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[10] See section 3.24 and Annex K of this report. Statements were made by Fiji, India, Iran, Japan, Malaysia, Philippines, Republic of Korea, Sri Lanka and Thailand.
[11] Due to its length, a copy of this document is not attached as annex.

APCTT deepened regional cooperation of member countries by establishing the following knowledge networks and platforms towards strengthening the capacities of countries in the Asia-Pacific region: (a) Renewable Energy Cooperation-Network for the Asia Pacific (RECAP) and Renewable Energy Technology (RET) Bank; (b) Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and Southeast Asia (SATNET Asia) and Sustainable Agricultural Technology Database; and (c) Asia-Pacific Nanotechnology R&D Management Network. The Centre designed and delivered 77 capacity building programmes in 16 member countries, in partnership with APCTT focal points, and mobilized additional resources from partner organisations and agencies to support the implementation of these programmes.

APCTT helped member States, including India, Thailand, Cambodia, Indonesia, Lao PDR, Nepal, Malaysia, Myanmar, Philippines, Vietnam and others, strengthen their renewable energy policy through demand-driven activities. Lao PDR and Indonesia were supported in developing national technology reports to strengthen enabling environment and technology ecosystem for affordable sustainable energy.

Bhutan was supported in establishing the country's first manufacturing facility for biocontrol agents; and a farmer's federation in India was assisted in facilitating export of bananas to China.

The APCTT programmes enabled the Philippines to learn new insights, tools and methodologies to develop national STI capacities particularly in new and emerging technology sectors such as renewable energy, climate resilient agriculture, and nanotechnology.

3. Which countries have benefited the most from APCTT's outputs?

The report on *APCTT Achievements (2014-2018)* contains in its Annex 1 a detailed list of APCTT activities (e.g., workshops, trainings, conferences, etc.) carried out during the reporting period of 1 January 2014 to 31 July 2018. Based on this list, the number of times member countries participated in the various activities was counted to get an indication of which countries had benefited most from APCTT's outputs. The host country, India, had participated the most, followed by Thailand, Malaysia, Philippines, and Indonesia. Of the top 20 participating member countries, 12 countries are members of the APCTT Governing Council. Kazakhstan is the only current member of the Governing Council that does not belong to the top 20 participating countries.

4. **Which APCTT's outputs were most beneficial to the countries? Which outputs need to be discontinued?**

The *APCTT Vision, Strategy and Action Plan (August 2017)* reports that the confirmed high priority activities based on expressed demands from member countries – presumably the most beneficial to them – include the following:

- Strengthening of STI policy and strategies to meet the SDGs.
- Strengthening National Innovation Systems, innovative entrepreneurship and enterprise development.
- Building capacity in new and emerging technologies such as renewable energy, nanotechnology and sustainable agriculture, water management, data-driven technologies, among others, in the context of 2030 Agenda.
- Developing training materials, using "Training of Trainer" methodology for STI and technology transfer capacity building.
- Strengthening technology intelligence of member country stakeholders (policy makers, academia, SMEs, R&D institutions, and technology promotion agencies) through providing critical knowledge on trends in technology transfer and development, technology policies, data and analysis, case studies, best practices and innovative technologies.

The recent *Assessment of Quality, Usefulness and Viewership of APCTT Periodicals: Asia-Pacific Monitor and VATIS Updates* recommended that VATIS Updates be discontinued effective January 2018[12] while the Asia-Pacific Monitor could be strengthened by focusing mainly on two sections, namely, the technology policy and market scan, and the special feature section by including a greater number of analytical articles/papers on STI related issues relevant to the region.

5. **What adjustments have been made and needed to be made to the work programme of APCTT to better align with the 2030 Agenda for Sustainable Development?**

The Sustainable Development Goals (SDGs) that are of direct relevance to the work of the APCTT are those related to science, technology and innovation as contained in Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation, and in Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development.

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[12] This has been implemented.

Based on its Strategic Plan (2013-2017), the APCTT's work programme focuses on following three strategic areas: science, technology and innovation; technology transfer; and technology intelligence.

It is evident from a comparison between SDG9 and SDG17 and the work programme focus of APCTT in the 3 strategic areas of science, technology and innovation, technology transfer, and technology intelligence that on the whole the APCTT work programme is generally aligned with the 2030 Agenda for Sustainable Development.

Nevertheless, some adjustments can be made to better align the APCTT work programme with the SDGs. SDG9 calls for "greater adoption of clean and environmentally sound technologies" while SDG17 aims to "promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favorable terms". Although the APCTT work programme covers "renewable energy" and "sustainable agriculture", it will better align with the SDGs if it explicitly includes "environmentally sound technologies". Nevertheless, APCTT training programmes include technology valuation, which aims to improve the participants' ability to negotiate better the terms of technology transfer.

Overall, the findings of this study show the substantive relevance of APCTT's mandate and a number of countries find the APCTT activities useful and have made some impact and benefited them in strengthening national innovation systems and in formulating STI policies, among others. However, it is evident that the Centre's capacity to deliver substantive capacity building activities has been severely constrained by the limited staffing structure and funding. It is concluded the impact and benefits that Centre provides to the countries have also been constrained.

Sustainability

6. What is the desired level of human and financial resources required to make APCTT more relevant and sustainable?

If the APCTT is to have a staff complement comparable to a section in the ESCAP secretariat, then the professional staff will need to comprise of at least the following: 1 P5, 1 P4, 2 P3/P2, and the appropriate number of locally recruited full time staff, in particular G6 and G7 staff who could work as technical experts. For practical purposes, however, the CSAM staffing structure may be used as model with 1 P5, 1 P4, 1 P3, 2 G7, 2 G6, 2 G5, and 1 G2.

7. What is the level of financial commitments from the host government and other member States expected over the next five years?

The average total contribution to the Centre during the past six years is only US$391,341 of which about 50% is contributed by the host country, India. This level of contribution from the host country is very much lower than the contributions to other ESCAP regional institutions. For example, in 2017, APCTT received a contribution from the host country for the amount of $198,500 while hosts of other Regional Institutions contributed US$1,575,458 for APCICT, US$1,783,700 for SIAP and US$1,720,000 for CSAM in 2017. Total contribution to APCTT in 2017 was only US$451,436 compared to US$1,582,458 for APCICT, US$2,359,348 for SIAP, and US$2,083,510 for CSAM.

In 2009 the Governing Council urged member States to increase institutional support to an annual contribution of US$30,000 from developing countries and US$7,000 from least developed countries to enable the Centre to deliver effective services to members and associate members on a sustainable basis. This was almost similar to a much earlier decision of the Centre's Governing Board in the late 1990s asking developing and least developed member countries to make an annual contribution of US$20,000 and US$5,000, respectively. Unfortunately, these decisions have been largely ignored and there are no clear and definite indications that member States would heed these decisions during the coming five years. However, during the Second Session of the ESCAP Committee on ICT STI in August 2018, the representative of India stated that her country was considering enhancement of its voluntary contributions in line with the host country agreement.

8. What is the resource gap to operate APCTT at the desirable level?

The level of contributions (in terms of US dollar) of member States to APCTT has been more or less static since 2004, despite the high-level of inflation in India. APCTT received INR 9,094,000 (equivalent of about US$200,000) in 2004 and INR 13,420,300 in 2016. Given the increase in consumer price in India, APCTT needed to receive INR 21,521,405, instead of INR 13,420,300 in 2016 to maintain the same purchasing power as in 2004. The difference is INR 8,101,105 which is equivalent around US$118,000.
A financial analysis by SPMD-ESCAP[13] also shows that contributions from India have remained at the same level of approximately US$200,000 annually to cover GS staff and other office operation costs. However, the average monthly cost of basic office operations in 2018 is approximately US$25,000 per month or US$300,000 per year. Therefore the resource gap just to cover current GS staff and office operations is a minimum of about US$100,000 per year.

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[13] See Annex I.

If the other three regional institutions (APCICT, SIAP, CSAM) are to be used as benchmark, an average total (host country and member States) annual contribution of about US$1.5-2.0 million will be needed by APCTT to be at par with the other regional institutions. Since the average annual contributions to APCTT is only around US$400,000, the resource gap is therefore about US$1.1-1.6 million annually in order for APCTT to be able to operate at approximately the same level as the other ESCAP regional institutions.

9. **What could be done to fill the gap? What other sources of funds should be explored by APCTT?**

The *APCTT Vision, Strategy and Action Plan (August 2017)* spells out the short, medium and long-term strategy for resource mobilization and identifies the various sources of funds that could be explored by APCTT. But if the practice currently existing in the other ESCAP regional institutions is to be the benchmark, then the most straight-forward means to fill the resource gap is for the host country to significantly increase its contribution to around US$1.0-1.5 million annually.

Efficiency

10. What measures could be in place to improve cost efficiency in delivering APCTT outputs?

The *APCTT Vision, Strategy and Action Plan (August 2017)* proposes two measures that may help improve the cost efficiency of delivering APCTT outputs. These are: (a) prioritization of activities and reforms; and (b) partnerships to enhance existing services.

APCTT should strengthen its core activities based on the expressed demands from the member countries in line with its mandates and in support of the SDGs. Given the extremely limited human and financial resources of APCTT, it should prioritize its activities and conduct further reforms to accommodate increasing capacity-building demands.

With its limited human and financial resources, it is important for APCTT to select partners and seek type of engagements which would bring clear benefits to APCTT activities, at least for short and medium terms. There would always be some costs for investing and developing in partnerships, such as staff time, and financial resources to send staff members or experts to joint activities. APCTT has already identified many collaboration opportunities with different partners within ESCAP, with other regional and international organizations, ODA funded development agencies, NGOs and private sector organizations.

11. To what extent were in-kind contributions from the host government, other member States and partner organizations sought and received to supplement APCTT resources?

Aside from annual cash contributions and in line with the host country agreement, the host government provides in-kind contributions to the APCTT in the form of rent-free building and premises, including office and conference facilities, as well as maintenance and repair of the Centre's building, premises and facilities.

To supplement the Centre's resources, the APCTT secured funding of US$250,000 from the Government of India to establish the cooperation mechanism known as "Renewable Energy Cooperation-Network for the Asia-Pacific" (RECAP). The APCTT has also partnered with other organizations. In 2015, the Centre successfully concluded implementation of the South Asia component of the project funded by the European Union entitled "Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and Southeast Asia (SATNET Asia)".

Presented in *Table 3.3* are some recent projects funded by the host government and by multiple donors to supplement APCTT resources.

Table 3.3. Projects funded by host government and multiple donors

Project Title	Start/End	Budget US$	Source
Promotion of National Innovation Systems (NIS) in Countries of the Asia-Pacific Region – Phase II	2010-2015	323,194	Government of India
Creating an Enabling Environment for Competitive, Sustainable and Inclusive Enterprises	2012-2015	503,155	Joint Contribution from multiple donors
Creating an Enabling Environment for Competitive, Sustainable and Inclusive Enterprises	2012-2015	695,771	Government of India
Strengthening the National Innovation System (NIS) of ESCAP Member States with Special Focus on Technology Transfers and Deployment of Technology Innovations	2016-2017	281,836	Multi-donors
Institutional Support for APCTT (Multi-donors)	2016-2020	129,950	Multi-donors

12. To what extent did APCTT coordinate and cooperate with TIID and other substantive divisions of ESCAP in the design and delivery of its outputs? How can the coordination and cooperation be enhanced?

APCTT works closely with the Trade, Investment and Innovation Division (TIID), contributing to their biennium work programme. In addition, the Centre has been working with the Energy Division and the Environment Division, and has jointly implemented technical cooperation projects with the Centre for the Alleviation of Poverty through Sustainable Agriculture (CAPSA) and the Centre for Sustainable Agricultural Mechanization (CSAM). APCTT co-implemented a European Union funded project during 2012-2015 entitled "Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and Southeast Asia' (SATNET Asia)" in partnership with the Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA) and the Trade, Investment and Innovation Division (TIID) of ESCAP.

APCTT will implement activities of the capacity building component of the UNDA 10th tranche project, "South-South Cooperation for STI Policies in the Asia-Pacific Region" in 2019 together with TIID. Through its work on WEF Nexus, APCTT would complement the work on SDGs carried out by other ESCAP divisions (i.e. Energy and Environment) while supporting member countries to advance their work towards achieving the sustainable development goals related to food security (SDG 2), water security (SDG6) and energy security (SDG 7).

At the 9th (2013) and 10th (2014) sessions of the APCTT Governing Council, the Governing Council expressed appreciation for the guidance and valuable support provided to the Centre by the Trade and Investment Division of ESCAP.

3.2.2 Interviews and consultations

Interviews and consultations were conducted among various APCTT stakeholders including high-ranking and senior government officials of the host country, India; members of the APCTT Governing Council; relevant staff of the ESCAP secretariat; and the Head and staff of APCTT. The list of persons interviewed and consulted is shown in *Annex H*.

Consultations with Indian Government Officials and Relevant Organizations

A mission to New Delhi was conducted on 8-12 October 2018 to consult relevant Indian government officials, APCTT staff, and representatives of various organizations on the relevance, sustainability and efficiency of the Center (see *Annex H* for the list of persons met).

There was general consensus among the government officials from various concerned agencies that the APCTT remains relevant and useful within its given mandate to address the needs of the country and the Asia-Pacific region. Accordingly, they all confirmed their support

to keeping the Center in New Delhi.[14] In particular, the meeting with the Department of Scientific and Industrial Research (DSIR), the APCTT focal point in India, confirmed the strong desire of the Government of India to keep the Center in New Delhi. The DSIR stated that it was prepared to support the proposal to enhance the government's financial support to the Center over an agreed period. The same sentiment was noted during the meetings with the Joint Secretary of the Department of Commerce as well as with the National Research and Development Corporation.

During the meetings with senior officials of DSIR and the Joint Secretary of the Department of Commerce, an ESCAP secretariat staff gave a detailed presentation on the funding of APCTT, the existing trust funds, and the funding gap, which basically shows that there is insufficiency of financial resources and that there are no surplus funds available from which programme funds could possibly be drawn. A copy of this presentation is in *Annex I*. The officials duly noted the presentation and expressed appreciation for providing the much needed clarification on the financial issues confronting the Centre.

The meetings with a number of relevant organizations, such as the Confederation of Indian Industry, IIT Center for Rural Development and Technology, International Solar Alliance, Federation of Indian Export Organizations, and World Institute of Sustainable Energy, all expressed positive support to APCTT in terms of its relevance to their work and the efficient manner by which their cooperative efforts had been carried out.

Interviews of Members of APCTT Governing Council

Two members of the APCTT Governing Council were consulted during the mission to Bangkok in August 2018. They expressed strong support to APCTT stating that the programs and activities of APCTT were highly relevant to their countries and that such programs and activities were delivered effectively and efficiently. They also expressed concern that any plan to transfer the Centre to another country might cause some embarrassment on the part of the current host country. They agreed that at its current level of funding, the Centre might not be sustainable in the long term and expressed openness to the possibility of increasing their annual contributions to the Centre. They suggested that ESCAP should regularly notify member countries in advance concerning the remittance of their annual contributions.

Consultations with ESCAP secretariat staff

The consultations with ESCAP secretariat staff showed differing views. While some stated that the APCTT was relevant to the needs of member countries, others viewed it as irrelevant. There was consensus, however, that the Centre was not sustainable with its current level of

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[14] However, during the meeting with the Minister of Science and Technology, H.E. Harsh Vardhan, the Minister informed that he was not aware of the presence of APCTT in New Delhi or of its mandate and functions.

funding and staffing. There were also mixed views on the efficiency of the Centre's delivery of its services.
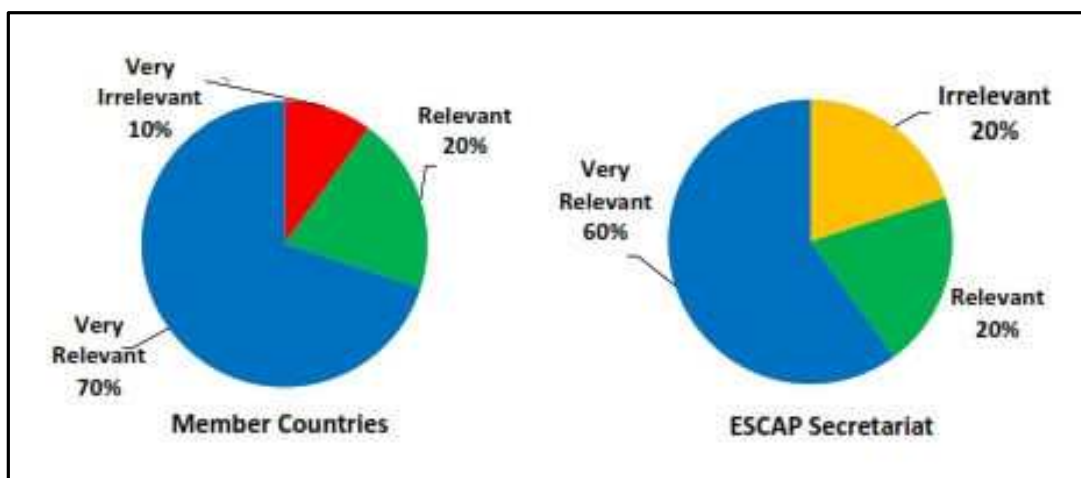
Consultations with APCTT Head and staff

Locally recruited staff of APCTT expressed strong support to keeping the Centre in New Delhi. All staff expressed the need to strengthen the Centre with additional professional staff and increased annual contributions from member countries, in particular, the host country. They believe that even with limited staff and financial resources, the Centre is able to efficiently and effectively deliver meaningful services and useful activities that are appreciated by member countries. These are made possible through, among others, cost-sharing with countries or organizations that host these activities and partnerships with similar minded organizations as well as through sheer hard work and long hours by all of the Centre's staff.

3.2.3 Survey

Survey questionnaires were sent out to the following stakeholders: ESCAP secretariat staff (8), member countries (50), national and regional organizations (150), and international organizations (17). Copies of the survey questionnaires are presented in ***Annex D***. Responses were received from 5 ESCAP secretariat staff, 10 officials from 9 different member countries, 30 national and regional organizations, and 2 international organizations. The complete survey results are presented in ***Annex J*** but selected main results are presented below.
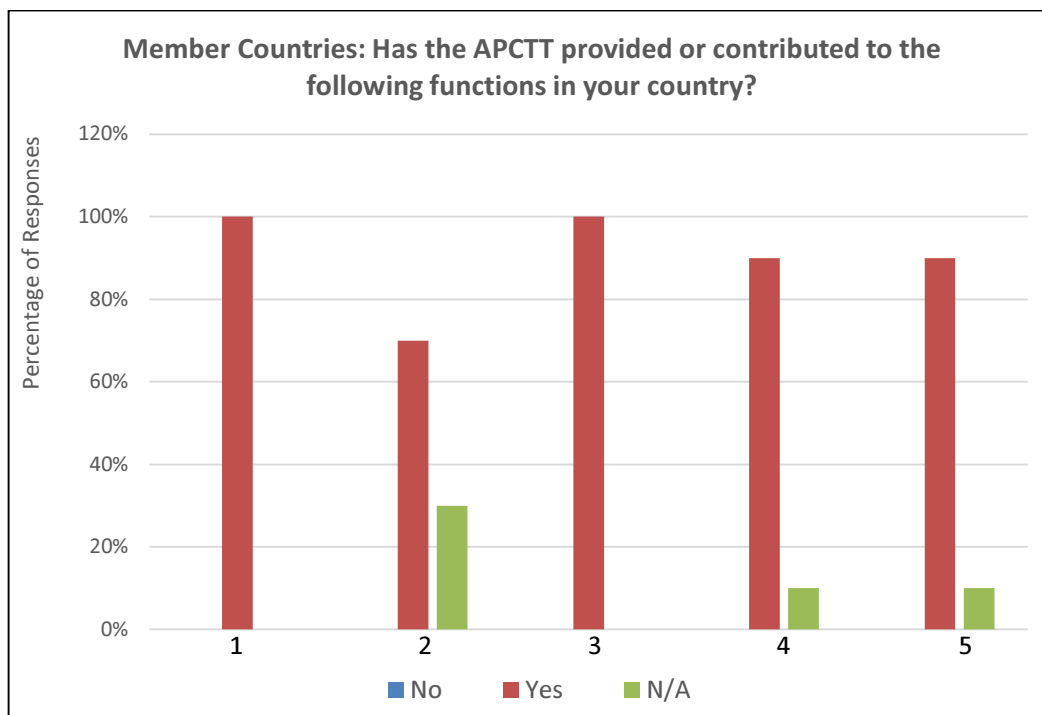
How relevant are the APCTT's objectives and outputs in the context of the 2030 Agenda for Sustainable Development and the priorities and requirements of member States?

90% of respondents from member countries and 80% of respondents from the ESCAP secretariat state that the objectives and outputs of APCTT are relevant or very relevant in the context of the 2030 Agenda for Sustainable Development and the priorities and requirements of member States.

Member Countries: Very Relevant 70%, Very Irrelevant 10%, Relevant 20%

ESCAP Secretariat: Very Relevant 60%, Irrelevant 20%, Relevant 20%

Has the APCTT provided or contributed to the following functions in your country?

Some measure of the impact of the work of APCTT may be gleaned from the responses of member countries to this question. 100% of respondents from member countries state that APCTT has contributed to the research and analysis of trends, conditions and opportunities of their country; 70% state that APCTT's advisory services have been useful; 100% state they benefited from the Centre's dissemination of information and good practices; 90% responds positively on networking and partnership with international organizations and key stakeholders; and 90% of respondents say that APCTT has contributed to training of national personnel, particularly scientists. It thus seems apparent that the limited activities of APCTT have made some impacts, though necessarily also limited, on the science, technology and innovation sector of member States.

Member Countries: Has the APCTT provided or contributed to the following functions in your country?

1 – Research and analysis of trends, conditions and opportunities
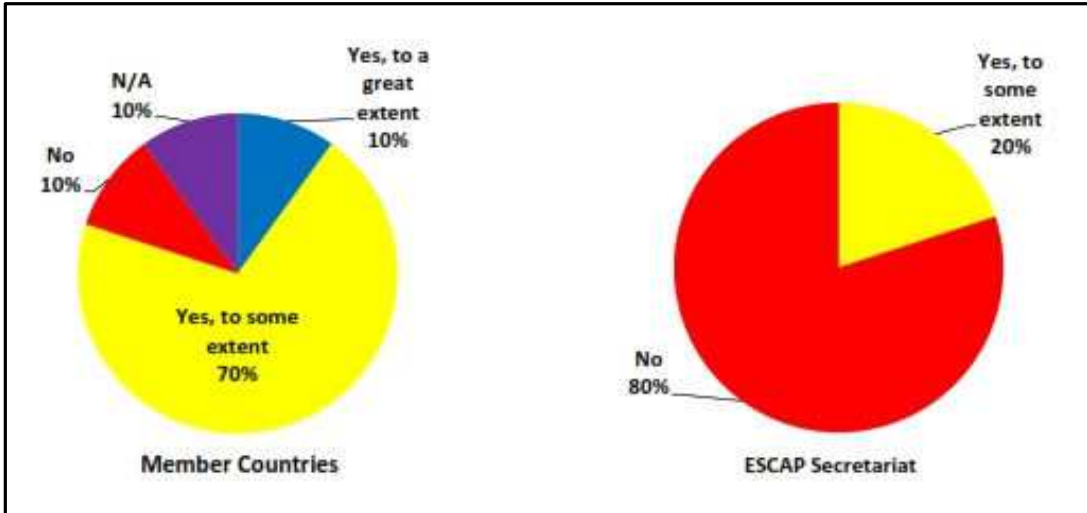2 – Advisory services
3 – Dissemination of information and good practices
4 – Networking and partnership with international organizations and key stakeholders
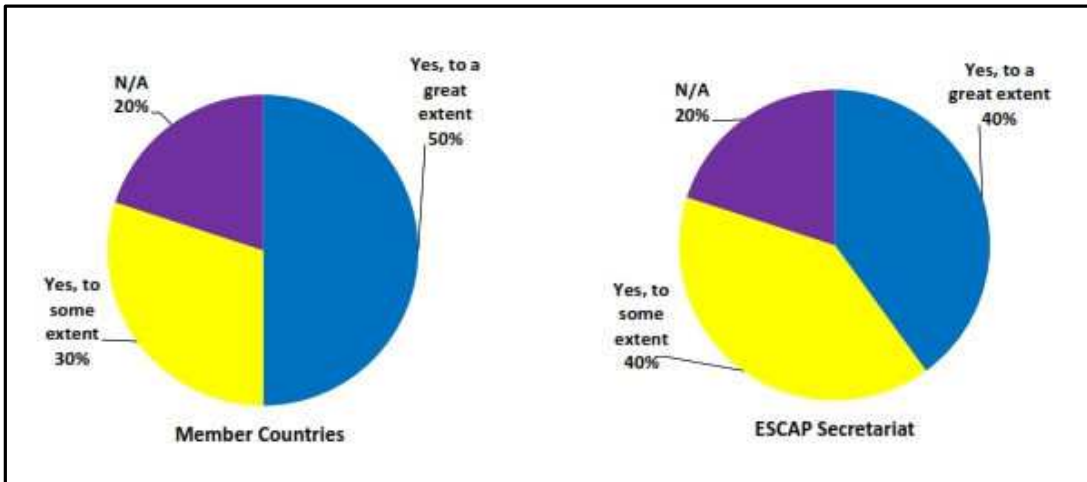5 – Training of national personnel, particularly national scientists

Is the APCTT sustainable with its current level of human and financial resources?

Concerning the sustainability of APCTT with its current level of human and financial resources, the views of member countries and the ESCAP secretariat differ significantly. While 80% of respondents from member countries state that the APCTT is to some or great extent currently sustainable, 80% of respondents from the ESCAP secretariat state the exact opposite. This indicates a possible knowledge gap between member States and ESCAP secretariat on APCTT's financial status.
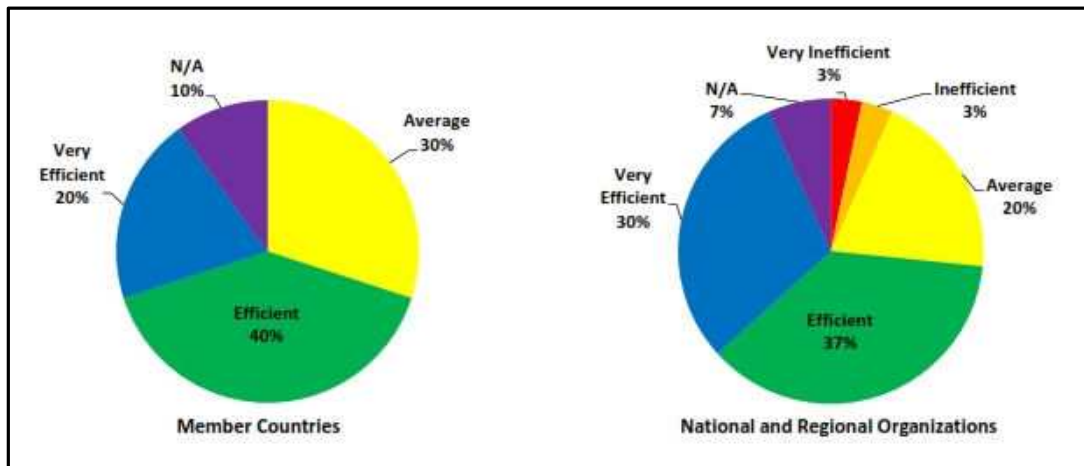
Member Countries | ESCAP Secretariat

Are the human and financial resources of APCTT used efficiently to deliver activities and outputs in coordination with other stakeholders?

On whether the human and financial resources of APCTT are used efficiently to deliver activities and outputs in coordination with other stakeholders, both the member countries and the ESCAP secretariat agree with 80% of respondents from member countries and the ESCAP secretariat stating that it does to some or great extent.
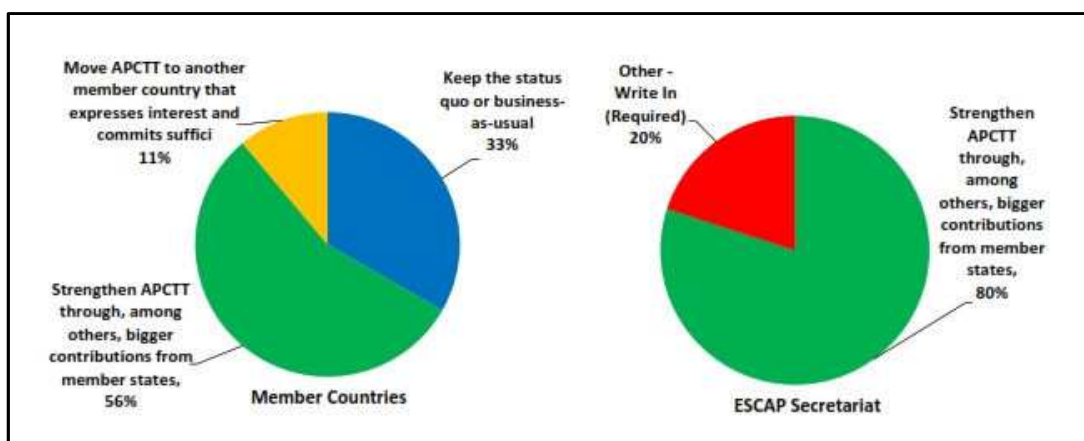
How efficient is APCTT's delivery of its capacity building activities in your own country?

Member countries (60%) and national and regional organizations (67%) also agree that the APCTT efficiently or very efficiently delivers its capacity building activities in their respective countries.

What should be done with the APCTT?

About 56% of respondents from member countries and 80% from the ESCAP secretariat want to strengthen APCTT through, among others, bigger contributions from member States, in particular, from the host government; while 33% of respondents from member countries want to keep the status quo or business-as-usual, and only 11% want to move APCTT to another member country that expresses interest and commits sufficient financial support. These findings imply that an overwhelming majority want to keep APCCT at its current location in New Delhi.

3.2.4 Second Session of ESCAP Committee on ICT STI, Bangkok, August 2018

The Second Session of the ESCAP Committee on ICT STI held in Bangkok, Thailand in August 2018 made the following recommendations that are directly relevant to APCTT and the current study:

- Recommendation 5: The Committee recommends the continuation of the current work of the Asian and Pacific Centre for Transfer of Technology in addition to the emerging areas on information and communications technology (ICT), big data, artificial intelligence and the Internet of things.

- Recommendation 6: The Committee, being of the opinion that the mandate and the work of the Asian and Pacific Centre for Transfer of Technology is crucial and relevant to the implementation of the 2030 Agenda, recommends that the Centre's current mandate should not be changed or diluted in any form and calls for the further strengthening of the Centre.

- Recommendation 7: The Committee expresses the concern that the current human resources and financial capacities of the Asian and Pacific Centre for Transfer of Technology are not satisfactory in terms of carrying out mandated activities and meeting the growing demand for the Centre's activities. The Committee requests non-contributing member States to consider providing voluntary financial contributions, and member countries to enhance their level of voluntary contributions to strengthen support for the Centre.

At the same meeting, the representative of India "stated that her country was considering enhancement of its voluntary contributions in line with the host country agreement; however, utilization of existing budget and resources of the Centre needed to be evaluated along with clarity on the long-term vision and programme of the Centre."

A number of representatives of member States, namely, Fiji, India, Iran, Japan, Malaysia, Philippines, Republic of Korea, Sri Lanka and Thailand, delivered positive statements during the meeting, which are generally supportive of strengthening the APCTT. These statements are presented in *Annex K*.

This evaluation supports the recommendation of the ESCAP Committee on ICT STI that the APCTT should strengthen its activities related to the "emerging areas of information and communications technology (ICT), big data, artificial intelligence, and the Internet of Things."

This evaluation also supports the initiatives recommended by member States as follows:[15]

- Strengthen the innovation ecosystems in countries across the region (Malaysia).
- Expand into water and related issues since renewable energy and water are crucial enabling factors for social well-being and economic growth (Thailand).
- Provide capacity building support in such technology transfer areas as nanotechnologies, agricultural-, renewable energy- and water-related technologies (Japan).
- Initiate discussions and studies to develop new methodologies and indicators for measuring innovative capacities of member States, to consider not only the economic contribution of STI but also its social, cultural and environmental impacts (Philippines).
- Include skill development and entrepreneurship in new and emerging technological sectors (Republic of Korea).
- Expand the activities not only to disseminate technologies for transfer but sharing best practices through a mechanism for exchange of human resources; and develop a database of testing institutions and laboratories and the resources and services the offer (Sri Lanka).
- Set up a start-up network, an online platform for dissemination of information about start-up activities, technology programmes, and relevant services and resources (Islamic Republic of Iran).
- Make APCTT to be a gateway of technologies, knowledge sharing and partnerships (Fiji).
- Evolve clear roadmaps for involving S&T personnel to enable seamless exchange of expertise for the benefit of LDCs in the Asia-Pacific region (India).

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[15] These could be prioritized and gradually pursued as financial and manpower resources become available.

This chapter provides the general conclusions of the evaluation as well as the conclusions relating to the specific evaluation criteria, namely, relevance, efficiency, and sustainability.

4.1 General Conclusions

Based on the findings of this study, it is concluded that the mandate of the APCTT remains relevant in the context of the ongoing reform of ESCAP and the 2030 Agenda for Sustainable Development. It is also evident that majority wants to keep APCTT at its current location in New Delhi. A number of member countries also find the APCTT activities useful and have made positive impacts on and benefited national innovation systems and STI policy-making, among others. The impacts are expectedly limited but nevertheless appreciated by many member countries. The engagement of APCTT with the private sector is also limited. However, APCTT is able to deliver its capacity building activities efficiently despite the current limited financial and human resources. However, it is also concluded that under the current severe financial and human resource limitations, the effective operations of the APCTT cannot be sustained.

These conclusions are supported by ample information derived from the comprehensive desk review of relevant documents, and from the consultations, interviews and survey of representatives of member countries, APCTT and ESCAP secretariat staff, and relevant national, regional and international organizations. These conclusions are also consistent with the statements and recommendations made at the Second Meeting of the Committee on ICT STI held in Bangkok in August 2018.
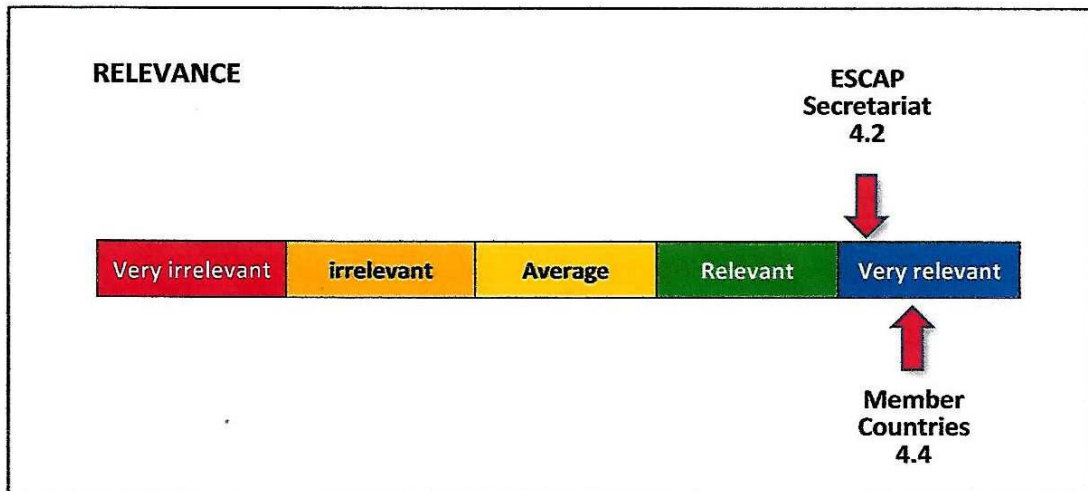
These general conclusions are also derived from the observations and specific conclusions presented in the next section.

4.2 Specific Conclusions

Relevance

The findings of this study show the substantive relevance of APCTT's mandate in the context of the ongoing reform of ESCAP and 2030 Agenda for Sustainable Development. Indeed the Second Meeting of the ESCAP Committee on ICT STI in August 2018 expressed "the opinion that the mandate and the work of the Asian and Pacific Centre for Transfer of Technology is crucial and relevant to the implementation of the 2030 Agenda" and recommended "that the Centre's current mandate should not be changed or diluted in any form and calls for the further strengthening of the Centre."

The results of the survey of member countries and relevant staff of the ESCAP secretariat also confirm this conclusion as shown graphically below.[16] The respondents from the ESCAP secretariat and from the member countries consider very relevant the APCTT's objectives and outputs in the context of the 2030 Agenda for Sustainable Development and the priorities and requirements of member States. Respondents from member countries have also confirmed that APCTT's initiatives in research and analysis of trends, conditions, and opportunities, advisory services, dissemination of information and good practices, networking and partnership with international organizations and key stakeholders, and training of national personnel particularly national scientists have had positive impacts on or contributed to enhancing the STI sector of their respective countries. However, there appears to be need to further enhance initiatives on emerging technologies in ICT, big data, and Internet of Things, among others, as well as widen activities on environmentally sound technologies, building on current efforts on renewable energy and sustainable agriculture.

The statements of commendation, strong support and endorsement made by member States during meetings of the APCTT Governing Council also provide evidence that on the whole the Centre's outputs are designed and delivered in line with the needs of the respective member States. This is further confirmed during consultations and interviews of government officials and various agencies and organizations that have partnered or participated in the Centre's activities.

Overall, the findings of this study show the substantive relevance of APCTT's mandate and a number of countries find the APCTT activities useful and have made some impact and benefited them in strengthening national innovation systems and in formulating STI policies, among others. However, it is evident that the Centre's capacity to deliver substantive capacity
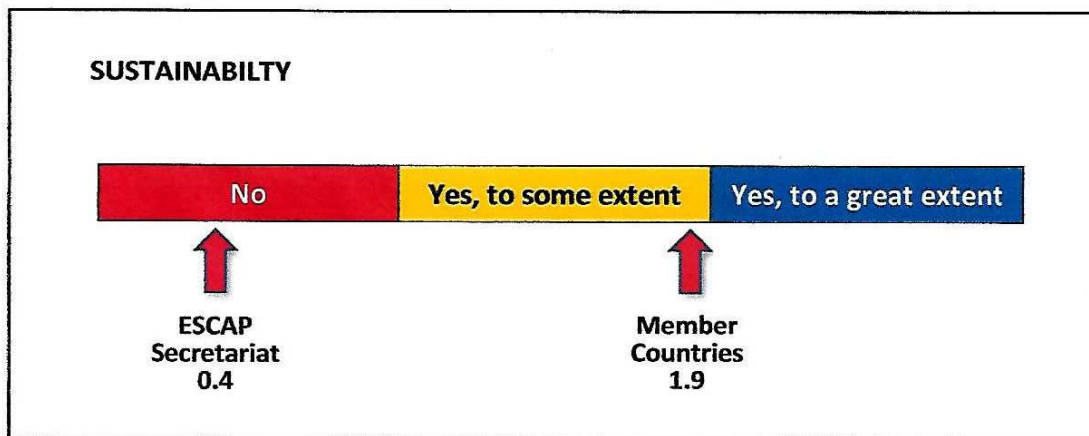
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[16] For the purpose of the graphical presentation, the answers to the survey question are given the following scores: 1- very irrelevant, 2- irrelevant, 3-average, 4-relevant, 5-very relevant.

building activities has been severely constrained by the limited staffing structure and funding. It is concluded the impact and benefits that the Centre provides to the countries have also been constrained.

Sustainability

Although there are views to the contrary, the findings of this study show that the APCTT is not sustainable in terms of the current level of its financial and human resources. Indeed the Second Meeting of the ESCAP Committee on ICT STI in August 2018 expressed "the concern that the current human resources and financial capacities of the Asian and Pacific Centre for Transfer of Technology are not satisfactory in terms of carrying out mandated activities and meeting the growing demand for the Centre's activities" and requested "non-contributing member States to consider providing voluntary financial contributions, and member countries to enhance their level of voluntary contributions to strengthen support for the Centre."

However, the survey of member countries and the relevant ESCAP secretariat staff show contrasting results as shown graphically below.[17]

When asked, "Is the APCTT sustainable with its current level of human and financial resources?", 80% of respondents from member countries said yes to some or great extent; but 80% of respondents from the ESCAP secretariat said no. This indicates a possible knowledge gap between member States and ESCAP secretariat on APCTT's financial status. This may also perhaps be due to differing appreciation or interpretation of the term "sustainable". Indeed, consultations with representatives of member countries - when there was opportunity to explain and elaborate what is meant by sustainability - confirm the conclusion that, at its present level of funding and staffing, member countries feel that the

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[17] For the purpose of the graphical presentation, the answers to the survey question are given the following scores: 0-no, not sustainable, 2- yes, sustainable to some extent, 3, yes, sustainable to a great extent.

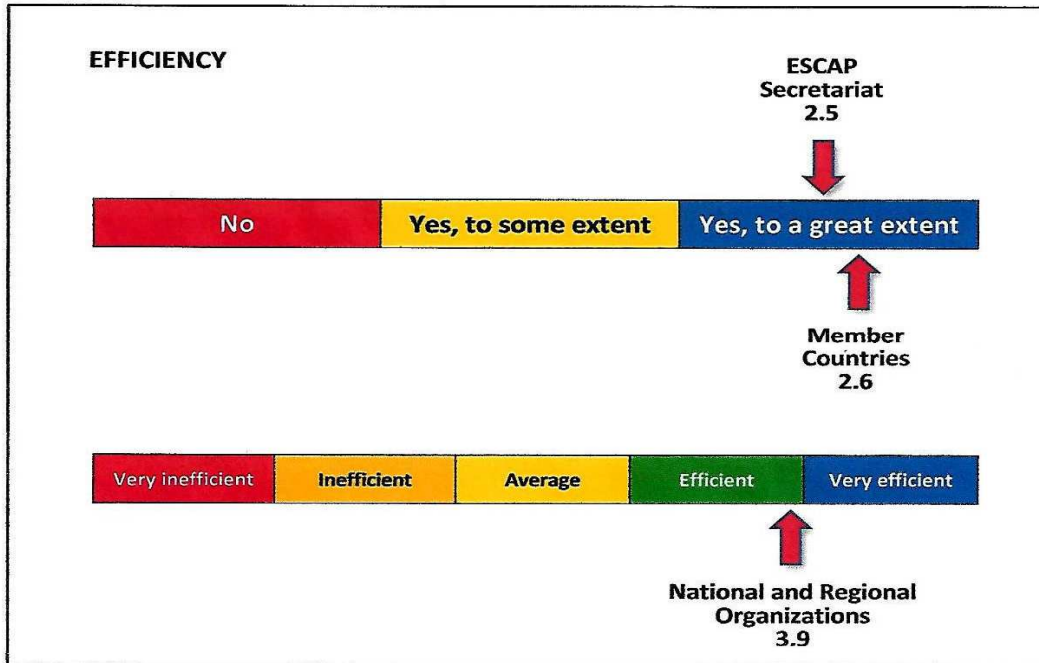Centre will not be sustainable in the long run.

Efficiency

The findings of this study show the efficiency of APCTT's delivery of its capacity building activities. This conclusion is reflected in the recommendation of the Second Meeting of the ESCAP Committee on ICT STI held in August 2018 to continue "the current work of the Asian and Pacific Centre for Transfer of Technology in addition to the emerging areas on information and communications technology (ICT), big data, artificial intelligence and the Internet of things."

This conclusion is also supported by the results of the survey of member countries and relevant ESCAP secretariat staff[18] as well as the results of the survey of national and regional organizations that have worked with the Centre[19] as shown graphically below. Respondents from the ESCAP secretariat and member countries were asked, "Are the human and financial resources of APCTT used efficiently to deliver activities and outputs in coordination with other stakeholders?", while those from national and regional organizations were asked, "How efficient is APCTT's delivery of its capacity building activities in your own country?"

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[18] For the purpose of the graphical presentation, the answers to the survey question are given the following scores: 0-no, not efficient, 2-yes, efficient to some extent, 3-yes, efficient to a great extent.
[19] For the purpose of the graphical presentation, the answers to the survey question are given the following scores: 1-very inefficient, 2-inefficient, 3-average, 4-efficient, 5-very efficient.

The interviews of representatives from various national and regional organizations also confirm the conclusion that the Centre has efficiently delivered its capacity building activities.

Finally, the review of reports and relevant documents shows that the APCTT implements two measures to improve the cost efficiency of delivering APCTT outputs, namely, through prioritization of activities and reforms, and through partnerships to enhance existing services.

5. RECOMMENDATIONS

Based on the key findings[20] and conclusions of the evaluation this study proposes six recommendations for improving the results-orientation, relevance, sustainability and efficiency of APCTT.

> **Recommendation 1**: **APCTT should remain at its present location provided that the host government commits to increase its financial contribution to the Centre, over an agreed period, to a level comparable to that contributed by governments hosting other ESCAP regional institutions.**

It is evident from the findings of the study that the host government is still very much interested in keeping the Centre in New Delhi and that it is willing to consider enhancing its annual contributions to the Centre. Increases in annual contribution may be made in several phases over an agreed reasonable period of time. For example, over a period of four years planned increases may be made starting from US$500,000 during the initial phase (representing an increase of US$300,000 from the current level of about US$200,000) and gradually increasing to the same level of contributions of the host governments of other ESCAP regional institutions, which range from approximately US$1.0 million to US$ 1.5 million annually. If increased host country funding is not forthcoming, other options should be explored.

> **Recommendation 2**: **Renegotiate the Host Country Agreement to allow the use of funds from India to recruit international staff through a formal amendment or an exchange of letters, or hold the provision of Article XIII, 1(d) in abeyance through an exchange of letters, whichever is more expedient, to enable the immediate use of host government contribution for the salaries and allowances of internationally-recruited staff.**

Under the present Host Country Agreement, the financial contributions from the Government of India cannot be used for salaries and allowances of internationally-recruited staff. Thus even if the host government is able to provide additional financial resources, it may not be possible to recruit international staff. Accordingly, there will be need to review and renegotiate this Agreement. However, this process may take time. Since it was felt during the consultations with representatives of the host government that there was mutual desire on the part of both the ESCAP secretariat and the Host Government to strengthen the APCTT the

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[20] Among the key findings are the recommendations and proposed actions in the *APCTT Vision, Strategy and Action Plan (August 2017)* many of which have already been tried or implemented by the Centre.

soonest possible time, the idea of merely exchanging letters to either amend or temporarily suspend the provision of Article XIII, 1(d) was floated with no discernable objections at the meeting with the Department of Scientific and Industrial Research of the Ministry of Science and Technology, the focal point and the host ministry of APCTT. If either option is possible within the legal framework of the host government, this approach should be immediately explored and implemented.

> **Recommendation 3**: **Pursue vigorously the implementation of the 2009 Governing Council decision urging member States to increase institutional support to an annual contribution of US$30,000 from developing countries and US$7,000 from least developed countries to enable the Centre to deliver effective services to members and associate members on a sustainable basis.**

This 2009 Governing Council decision is basically a reiteration of the late 1990s decision of the Governing Council. Both decisions have remained largely unimplemented. The APCTT, together with the ESCAP secretariat, should pursue vigorously the implementation of this decision, regularly reminding member countries concerning this decision. And taking into consideration the huge demand for the services of the APCTT from member countries, it is possible that the increased contribution from the host government may spur other member countries to start contributing or increasing their contributions in line with the 2009 GC decision.

> **Recommendation 4**: **Strengthen the APCTT by providing it with additional professional staff comprising one P5, one P4, one P3, and the corresponding technical and support staff.**

Once sufficient financial resources become available from the host government, the number of professional staff may be increased following the CSAM model to comprise one P5, one P4 and one P3, and the corresponding technical support staff, which may comprise 2 G7, 2 G6, 2 G5, and 1 G2 in order to enable APCTT to become more relevant, sustainable and efficient. The possibility of having NRLs and consultants should also be taken into consideration.

> **Recommendation 5**: **Endeavor to develop robust multi-stakeholder partnerships and meaningful engagement with the private and non-government sectors through, among others, linkages and cooperation with various technology transfer networks.**

It is a well-known fact that most technologies and patents are owned or are in the hands of the private sector. The relevance and impact of APCTT may be further enhanced by developing meaningful engagements with the private sector. In addition, among the targets of SDG17 are: (a) enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources; and (b) encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships. For APCTT, one way of attaining these targets and gradually developing private sector engagement is through meaningful linkages and cooperation with various technology transfer networks. Some examples of these networks are the following:

International Technology Transfer Network was founded in 2011 and based in Beijing, China. It is a professional service organization committed to promoting international technology transfer and international innovation cooperation. It has fostered long-term partnerships with more than 200 international technology transfer organization in 15 countries.

Association of European Science and Technology Transfer Professionals is a non-profit organization created in 1999, through the initiative of a multinational group of technology transfer professionals. The group aims to professionalize and promote technology and knowledge transfer between European scientists and industries from around the world. It currently has more than 500 members over 35 countries. It is based in The Hague, in the Netherlands.

Alliance of Technology Transfer Professionals is an alliance of eleven knowledge and technology transfer associations including the following:

Association of European Science and Technology Transfer Professionals is the premier, pan-European association for professionals involved in knowledge transfer between universities and industry. It has more than 800 members, covering 41 countries.

Association of University Technology Managers is a global network of members that come from more than 350 universities, research institutions, teaching hospitals and government agencies as well as hundreds of companies involved with managing and licensing innovations derived from academic and nonprofit research.

International Strategic Technology Alliance is an international collaboration and partnership platform among 27 renowned tertiary education institutions in China and the world in fostering applied R&D, technology transfer and commercialization of technologies and products.

Knowledge Commercialisation Australasia is the Australasian peak body leading best practice in industry engagement, commercialization and entrepreneurship for research organizations. It achieves this through expert delivery of stakeholder connections, professional development and advocacy.

PraxisAuril is a UK-based not-for-profit organization set up to support innovation and commercialization of public sector and charity research for social and economic impact.

Redtransfer is aimed at those who are professionally engaged in research management, knowledge transfer and innovation in both public entities and private entities.

Southern Africa Research and Innovation Management Association is a membership association for institutions and persons engaged in advancing research and innovation management.

Swedish Network for Innovation and Technology Transfer Support is an association for those engaged in knowledge and technology transfer.

Society for Technology Management is a not-for-profit organization which provides a facilitative environment for successful technology transfer processes and promotes best practices in technology management.

TechnologieAllianz is the commercialization network for German academic inventions that combines patent marketing and technology transfer agencies in a single network and offers professional technology transfer at the interface between science and marketplace. Provides enterprises with access to the entire range of evaluated and patented research results from German universities and research institutes.

University Network for Innovation and Technology Transfer promotes the sound development of partnerships between academia and industry, maintaining a close partnership between institutions of higher learning, and the individuals and institutions that support their activities.

> **Recommendation 6**: **Give greater focus in the APCTT work programme to the transfer, dissemination and diffusion of emerging and environmentally sound technologies to developing countries on favorable terms in delivering capacity development and technical cooperation work.**

The work programme focus of APCTT in the 3 strategic areas of science, technology and innovation, technology transfer, and technology intelligence is generally aligned with the 2030 Agenda for Sustainable Development. It may be further strengthened and better aligned

with the SDGs, in particular with SDG9[21] and SDG17[22], by giving greater focus to the transfer, dissemination and diffusion of emerging and environmentally sound technologies to developing countries on favorable terms in delivering capacity development and technical cooperation work. This may be further developed based on APCTT's current work in the areas of renewable energy and sustainable agriculture technologies, which are among the important environmentally sound technologies needed by developing countries.

Once sufficient financial and manpower resources become available, APCTT should consider including in its suite of activities the various recommendations made by member States, in particular those suggested at the Second Meeting of the ESCAP Committee on ICT STI held in August 2018, which include, among others, emerging areas of information and communications technology, big data, artificial intelligence, and the Internet of Things as well as water-related technologies.[23] Activities may include not only capacity building but also, among others, enhanced knowledge sharing and partnerships, exchange of experts and S&T staff, and networking of start-ups.

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[21] One of the targets of SDG9 is "by 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes."
[22] One of the targets of SDG17 is to "promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed."
[23] See section 3.2.4 and Annex K.