

# **Multilevel Collaborative Networks and Organisational Innovativeness of Public Agencies in ASEAN**

**Salinthip Thipayang**  
**Chulalongkorn University**

**Achara Chandrachai**  
**Chulalongkorn University**

**Rath Pichyangkura**  
**Chulalongkorn University**

**Sukree Sinthupinyo**  
**Chulalongkorn University**

*In this study, existing multidimensional and cross-correlated aspects of contributing factors of public innovation and organisational innovativeness in literature are reviewed and the effects of international multilevel collaborative network on organisational innovativeness of public agencies in ASEAN are discussed. Based on the ASEAN Talent Mobility programme as a case study, it can be concluded that international cross-sectoral collaborations of public-private-academia partnership can lead to new initiation, new channel of collaborative research, best practice exchanges, and in turn lead to new top down policy implementations and impact the structure and administration of the associated government agencies. The resulting changes create positive impact to the organisation mandate and performance. Key findings and insights gained from this study can be used to derive network and external linkage innovativeness factor for the future development of measurement framework model and multidimensional construct of organisational innovativeness of public agencies in developing countries.*

## **INTRODUCTION**

Public organisations play crucial roles as policy regulators and service providers and account for a significant share of economic development especially in the ASEAN member countries. In the current fast changing global economy of internet of things and social network connectivity, public organisations are increasingly under pressure to be more innovative in delivering satisfactory societal services and solutions in responsive and timely manner under limited budgets and resources. Innovation in non-profit seeking public sector differ from profit orientated private sector in various aspects including more emphasis on changes of bureaucratic behaviours, implementing new way of conducting routine work processes (Halvorsen et al., 2005; and Kettel et al., 2014) and references to the concept of organisational

reform or New Public Management (NPM) (Hood, 1991) referring to a new point of view towards the public organizational design to be more businesslike and more efficient to service the private sector and the citizens.

However, most innovation related research studies are dedicated to innovation in private firms but not in public or government sector. Furthermore, there are even less number of articles about innovativeness compare to innovation in public sector (153 vs. 2,667 references respectively from Springer) and most of these references were in the topics of public innovation policy and public procurement. Thus, our research will help contribute to the current research gap in public sector organisational innovativeness in developing countries.

In this study, the definitions of organisational innovation and innovativeness by various authors are reviewed along with previous well known frameworks and constructs for measuring public sector innovation and organisational innovativeness. The effects of multilevel collaborative networks and external linkages to organisational innovativeness are discussed based on a case study of the ASEAN Talent Mobility (ATM) programme. Different multidimensional factors for measuring public sector innovation and organisational innovativeness are then compared to our proposed conceptual measurement framework model of Public Organisational Innovativeness Tool (POINT).

### **Organisational Innovation vs. Innovativeness in Public Sector**

There is no definite consensus on the definition of organisational innovation as the exiting literature is rather diverse and scattered (Lam, 2005). In general, organisational innovation or sometimes referred to as administrative innovation denotes the non-technological aspects of innovation that occurs in an organisation such as changes in the structure and processes of an organisation due to implementation of new managerial and working concepts and practices, supply chain management or quality management systems (OECD, 2005; Damanpour, 1987; and Damanpour & Evan, 1984). Newman et al. (2001) defines innovation in public sector as a discontinuous or step change, as something which is completely new to a particular local authority (though which may have previously been applied elsewhere), and a change which had already been implemented rather than just an aspiration or planned initiative. This definition focuses on changes that accentuate incremental innovation and puts the focus on implementation. Green et al. (2001) defines innovation in public sector as doing something new i.e. introducing a new practice or process, creating a new product, goods or service, or adopting a new pattern of intra- or inter-organisational relationships including the delivery of goods and services. This definition concentrates on creating improved service delivery and intra- or inter-organisational multilevel networks. Mulgan & Albury (2003) defines public sector innovation as new ideas that work and successful innovation is the creation and implementation of new processes, products, services and methods of delivery, which result in significant improvements in outcome's efficiency, effectiveness or quality. This definition puts emphasis on successful implementation and increase in efficiency of service delivery to the public.

In this study, public sector innovation is defined as “the introduction, adoption, or implementation of a new idea, strategy, management practice, communication process or operational method and practice, which results in a new development and improved outcome and performance within the organisation and may result in better service quality delivery or outcome that increases efficiency, policy effectiveness, and values to the society”. The definition of public sector innovation is adapted from the definitions given by Innobarometer (2010): innovation is the implementation of a new or significantly improved service, communication method, process or organisational method; and by Albury (2005): innovation is the creation and implementation of new processes, products, services and methods of delivery, which result in significant improvements in outcomes efficiency, effectiveness or quality. It should be noted that this definition of public sector innovation follows the Input-Process-Output (IPO) model on how innovation occurs based on the system analysis approach. The definition takes into account the fact that some innovations may result in an improved outcome within the organisation but may not necessarily be translated to better service delivery, policy effectiveness and values to the society. In addition, the impact of policy effectiveness and values to society is added to the innovation definition since public organisations follow government mandates in implementing policies and regulations.

In contrast to innovation, organisational innovativeness considers multiple management and non-technological innovation related activities, emphasising organisational characteristics rather than specific innovation attributes (Damanpour, 1992). Kamaruddeen et al. (2010) concluded from their study that innovation seems to incorporate the adoption or/and implementation of new defined activities rather in subjective ways, whereas innovativeness appears to embody some kind of measurement contingent on an organisation's propensity towards innovation. In general, innovation must have occurred for an organisation to be considered innovative. However, for innovation to occur, the organisation must possess certain traits or characteristics that are conducive to innovation. Therefore, in this case innovativeness is antecedent to innovation.

One of the aims of this research is to identify, measure, and assess these characteristics that all together encompass the overall's organisational innovativeness of public agencies. In accordance with the previously mentioned definition of public sector innovation and the proposed conceptual framework model of POINT, public organisational innovativeness in this study is defined as "the overall tendency and capability of the public organisation to introduce and support innovative activities, processes, practices, and cultures that improve its operation, performance, efficiency and competitiveness". The innovative activities, processes, practices, and cultures include clearly identified and articulated organisational values, visions, missions, mandates and goals, leaders managers and employees share the same organisation visions of the future and targets, open and effective communication, explicit strategies initiation and follow-through for competitiveness, government policy coherence, leader and management practices and commitment to innovation, knowledge management and organisational learning, competence and willing workforce, sufficient resources and supportive infrastructure, utilisation of collaborative network and linkages, and other organisational functions that may lead to new developments, better service delivery or outcome that increase efficiency, policy effectiveness, and values to the society.

The definitions of public organisational innovation and innovativeness emphasize the new public management (NPM) concept first introduced by Hood in 1991 of increasing service quality and efficiency (Bekker et al., 2011) and also encompass the new paradigm shift towards public value governance (Bryson et al., 2014, and Hammer, 2016) focusing on performance driven by creating and delivering public value in a networked environment of coordination and collaboration with other organisations in the system of innovation.

### **Research Questions**

The aim of this study is to develop a suitable framework model and constructs for measuring organisational innovativeness of public agencies in ASEAN. Hence, the relevant variables affecting organisational innovativeness along the innovation activities, processes, and management need to be accounted for in developing the measurement constructs. The following research questions will be answered in this paper:

- a. How has innovation in public agencies been measured?
- b. How has organisational innovativeness in public agencies been measured?
- c. What are the variables and factors affecting organisational innovativeness in public agencies?

### **METHODOLOGY**

In order to answer the above research questions, we use literature reviews and examples of previous measurement models to address the definitions of innovation and innovativeness in public sector agencies and to identify and develop the suitable factors and conceptual framework. Qualitative research method of participatory observation of the development of ASEAN talent mobility (ATM) programme as a case study was used. The meetings and discussions with top government executives and policy makers were during various meetings of the ASEAN Committees on Science and Technology (COST) from 2013-2016.

## RESULTS AND DISCUSSION

### Measuring Public Sector Innovation

To answer the first research question, we start by investigating the well-known reference frameworks for measuring public sector innovation, which were initiated from the efforts of the governments in the developed countries or regions with the objectives to systematically measure and compare innovations that occur in their government agencies. Although differ in theme factors, indicators and detailed item statements and questions, all of the five measurement frameworks focus on public sector innovation are based on the input-process-output model of activities flows. These example measurement frameworks are discussed as follows:

The Korea Government Innovation Index (GII) was one of the early efforts of the government to measure public sector innovation and provides insights for the subsequent development of innovation index elsewhere. The Korea GII diagnosed the level of innovation via online web-based diagnostic system. Based on the results of the diagnostic, innovation strategies appropriate to the innovation levels and characteristics were recommended and implemented. Aside from innovation levels, government organisations can utilise the GII to identify key areas of weakness within the organization so that the organisation can begin to improve upon those areas. The government can view the overall results of the diagnostic to formulate and adjust innovation strategies for the entire government. The GII assesses leadership, organisational innovation capacity, and the extent of the attainment of innovation tasks using methods such as document reviews, surveys, on-the-site inspections and direct interviews with organisation heads (Yoon, 2006 and Kim et al., 2007).

The Nordic MEPIN was a joint research collaboration in Nordic countries (Denmark, Sweden, Norway, Finland and Iceland) started in 2008 and completed in 2011. The objective of the MEPIN project was to develop a measurement framework for collecting internationally comparable data on innovation in the public sector. The survey was conducted among the public sector organisations at both central, regional and local levels in the five Nordic countries and included government institutions such as ministries and directorates, municipalities, schools and hospitals (Bloch, 2010 and Bloch, 2011). A common questionnaire was developed with similar approach to the Community Innovation Survey (CIS) which is mainly designed to measure innovation in the private sector across Europe. The framework focuses on innovation process started from (1) the objectives of the innovation that are shaped by rules and government policy, (2) inputs to innovation e.g. budgets, training, and competence, (3) innovation process e.g. organisation culture and interfaces, (4) outputs e.g. types of innovation that occur, and impact on organisation, and (5) outcome to society and economic (Bloch, 2013; Bloch, 2010; Mortensen, 2010; Jorgensen, 2010; Annerstedt & Bjorkbacka, 2010; and Bugge et al., 2011).

The UK PSII was designed to accurately reflect how innovations happen in the public sector and to enable comparisons across agencies. The survey instrument was developed with the common guidance from the Oslo manual and the definitions of innovation were in consistent with the European Community Innovation Survey (CIS) and the Nordic MEPIN Survey. There are four measurement dimensions in the UK PSII framework which are (1) Innovation Activity, (2) Innovation Capability, (3) Impact on Performance, and (4) Wider Sector Conditions for Innovation. The indices give score based on a scale of 0-100% to these four factors. All the organisations participated in the survey received an individual organisation scorecard along with the overall findings to compare and benchmark their innovation index with peer organisations (NESTA, 2011; CFA & DAMVAD, 2009; Deloitte, 2009; Ernst & Young, 2009; and The Innovation Unit, 2009).

The Australia PSII was developed to measure and report innovation capacity and performance of the Australia public service and wider public sector. The online Public Sector Innovation Toolkit was developed in 2011 by the Department of Innovation Industry Science and Research (DIISR) and the Australian Government Information Management Office as an online resource centre to help individuals measure and evaluate innovation in their organisations. The full survey was launch in 2012 with responses from 473 individual from 83 public agencies. In the APSII framework, indicators are used to measure organisation innovation performance and capacity by identifying innovation activities, impact of

innovation, staff innovation potential, innovation management practices, innovation culture and leadership, agency innovation strategy, and innovation barriers and drivers both internal and external (DIISR, April 2011a; June 2011b; and June 2011c).

The European PSIS was the first EU wide attempt to develop a common tool to measure and benchmark innovation in the public sector. As an initial step, the Innobarometer survey consisting of 24 questions was conducted in 2010 targeted over 4,000 public organisations from across the 27 EU member states. The EPSIS consists of three factors of innovation enablers, activities, and outputs, and together forms 7 dimensions, and 22 indicators for measurement. The innovation enablers consist of two dimensions of human resources and quality of public service, innovation activities consist of two dimensions of capabilities and drivers and barriers, and outputs consist of three dimensions of innovators, effects on business performance, and government procurement. The 22 indicators are used to create a scorecard showing the relative strengths and weaknesses of a particular EU member country. However, due to a different nature of each indicator, from which some are based on hard statistical data, while others are based on soft (opinion-based) data, the scorecard cannot be used to evaluate and compare the overall relative performance of the responding countries. The scorecard methodology can only be effectively applied for evaluation of individual indicators, thus allowing the users to identify and compare particular dimensions where performance could potentially be improved (EPSIS, 2013 and Technopolis Group, 2011- 2013)

These public sector innovation measurement frameworks originated from the central governments' political will to benchmark and compare innovation capacity and performance of their public agencies across nationwide (Korea GII, UK PSII, and Australia PSII) and regionally (Nordic MEPIN and EU PSIS). Common factors include internal infrastructure support system and resources, management practices and capabilities, external conditions and contexts, and efforts to quantify some psychometric features of leadership characters and organisation culture. These projects require intensive manpower and funding resources over a period of few years. The use of in-depth interviews along with open-ended questionnaires can provide advantages in gaining more detailed quantitative and objective data for analysis and comparison. However, this method may not be suitable in an early phase of organisational innovativeness assessment without prior formal commitments and political supports from the governments and the participating respondent organisations.

### **Measuring Organisational Innovativeness**

To answer the second research question, we investigate how organisational innovativeness has been measured by literature review and select examples of research articles where organisational innovativeness dimensions, constructs and/or item statements were validated and tested. The following articles are selected based on their attempts to cover the topics of measuring organisational innovativeness and discussing the relevant factors in the framework models.

Open2-Innovation tool is an online web-based tool for rating organisational innovation performance along with measuring users' personal innovativeness. It is publicly freely available to access at <http://mcs.open.ac.uk/itool/>. It was developed to support Open University (OU) work on the U-STIR (User-Driven Stimulation of Radical Technological Steps in Surface Transport) project funded by the EU Framework 7 initiative and involves partners from Austria, Bulgaria, Italy, Spain, Germany, France and the UK (Caird et al., 2013). The tool was designed to be used as a starting point for users to empirically measure their organisation's innovation performance. The user is invited to respond to 28 statements by selecting a response to a statement from the three options of "tend to agree", "tend to disagree", and "don't know". The tool takes about five minutes to complete. The questions are classified in terms of the key indicators of innovation performance, namely: (1) enablers (human resources, finance, and organisational resources for innovation), (2) organisational activities (investments and expenditures to support innovation activities; connections established between organisations, disciplines, and users; and intellectual property (IP) generation), and (3) performance outputs (innovation introductions, resource efficiency innovation, valuable IP, and economic effects). The tool also includes a self-rating of personal innovativeness to explore the congruence between the user and their organisation. The overall rating of

organisational innovation performance is given as feedback together with the three component ratings and the personal innovativeness.

Wang & Ahmed (2004) developed and validated organisational innovativeness construct with 5 areas of innovativeness dimensions, which are (1) product innovativeness: measures the novelty of new product introduced to the market at a timely fashion, (2) market innovativeness: newness of approaches that companies adopt to enter and exploit the targeted market, (3) process innovativeness: introduction of new production methods, new management approaches, and new technology that can be used to improve production and management processes, (4) behavioral innovativeness: sustained behavioral change of the organisation toward innovations demonstrated through individuals, teams and management, and (5) strategic innovativeness: development of new competitive strategies that create value for the firm. All the five dimensions are inter-linked and together initially form a 29 item statements in the questionnaire with a seven-point Likert scale. After the scale validation and factor analysis, a 20 item statement model is adopted and this measurement framework has been used and cited to by subsequent studies of other researchers measuring organisational innovativeness (cited by 827 references so far according to emeraldinsight.com).

Lynch et al. (2010) reviewed various definitions of innovativeness stating that Hurt et al. (1977) was one of the earliest researcher to define innovativeness as “willingness to change” and discussed other definitions by subsequent authors include “capacity and behavioral willingness to innovate” (Avlonitis et al., 1994), and “capacity to introduce new processes, products, or ideas in the organisation” (Hult et al., 2004). The authors then proposed five key dimensions of organisational innovativeness namely, creativity, openness to new ideas, intention to innovate, willingness for risk-taking, and technological capacity to innovate to address the issue of setting strategic goal toward innovativeness to raise competitiveness of firms in tourism industry.

Moo et al. (2010) reviewed 12 journals and 56 articles to compare models for measuring organisational innovativeness in private firms and suggested three patterns for measuring innovativeness: (1) innovation adoption vs. innovation creation, (2) innovation type of product/ service vs. process, and (3) input-oriented vs. output-oriented measurement. The authors concluded from the literature reviews that there are a variety of concepts for capturing innovativeness which are not consistent in how they are measured depending on the underlying theory used by various studies. The authors suggest using the combination of both input (such as resources, infrastructure, management support, strategy, knowledge management, attitude toward risks, eagerness, creativity) and output (capturing the results of innovativeness in terms of number of new products, patents, impact of new products on company's profit) to measure innovativeness.

Skervlavaj et al. (2010) proposed and empirically test a model of organisational innovative improvement based on the impact of organisational learning culture in 201 South Korea firms employing more than 50 people in various industries. Organisational learning culture is defined as a set of norms and values about the functioning of an organisation based on the learning process of information acquisition, information interpretation, and behavioral and cognitive changes. The authors view organisational culture as competing value framework in a two-dimensional scale of flexibility vs. control orientation and activities occurring within vs. outside the organisation (Denison & Spreitzer, 1991, and McDermott & Stock, 1999). The organisational learning culture is measured via Skervlavaj et al. (2007) instrument with three constructs and 42 items on five-point Likert scales. The innovativeness measurement items are from Daft (1982), Tsai (1997), Wang & Ahmed (2004), and Liao et al. (2008) and the innovative culture measurement items are from Hurley & Hult (1998). The authors concluded that organisational learning culture has an impact on innovativeness and on technical and administrative innovations. Learning culture can result in maximizing the capability of innovation in high performance organisation.

Onag et al. (2014) initially identified 11 dimensions of organisational learning capabilities and developed a measurement scale with 50 item statements and validated it with the organisational innovativeness scale developed by Wang & Ahmed (2004) using 143 completed questionnaires. The data collection was carried out at Manisa Chamber of Commerce and Industry's committee member firms from various industries such as construction, manufacturing and services in Turkey. After the factor

analysis, 7 factors with 34 items were included in the final model. The seven factors are (1) knowledge sharing, (2) dialogue, (3) participative decision making, (4) managerial commitment, (5) experimentation and openness, (6) knowledge transfer, and (7) risk taking. The authors concluded that high organisational learning capability correlates to greater degree of organisational innovativeness.

Suwannathat et al. (2012 & 2015) designed a performance measurement system to measure innovation in public organisations in Thailand based on Thailand’s Public Management Quality Award (PMQA) developed by the Office of the Public Sector Development Commission (OPDC) in 2005. The performance measurement system initially consists of 8 constructs namely, (1) primary or initiation factors (culture), (2) external orientation factors, (3) strategic orientation, (4) organisational structure and boundaries, (5) essential skills for public offices, (6) essential resources in public organisation conducive to innovation, (7) factors associated with support mechanism, and (8) performance evaluation. The survey was conducted among 112 public organisations in which 38 organisations had won the award for service innovation from OPDC. After the statistical factor analysis, factor number (5) and (6) were combined together to form one factor of asset and capabilities. However, the authors did not provide details of the item statements used and proposed four different models of the causal influences of the revised seven latent variables to innovation. The authors also concluded from the findings that culture and external linkages factors have positive impact on innovation and service delivery.

All of the reviewed references use Likert scale item statements in creating the constructs to test and validate the framework models. In combining and comparing the variables and factors proposed in these models, we can derive the associated variables and factors affecting organisational innovativeness in public agencies, which answer our third research question as discussed in the Conclusion section.

**Case Example of Multilevel Collaborative Network: ASEAN Talent Mobility**

Collaborative network is one of vital paths for organisations to nurture innovation and increase competitiveness in the national innovation system approach, which stresses the flow of knowledge and technology among people, enterprises and institutions as key to innovation process (OECD, 1997 and Lundvall, 2015). In this study, we illustrate how ASEAN Talent Mobility (ATM) programme, initiated in 2013 by the National Science Technology and Innovation Policy Office (STI) alongside Thailand Talent Mobility (TTM) programme, developed into one of the main projects and strategic thrusts of the ASEAN Plan of Action on Science Technology and Innovation (APASTI) 2016-2025. More details of the chronological events associated with the ATM programme development along with national talent mobility project of Malaysia, Thailand, and Indonesia is summarised in Table 1.

**TABLE 1  
CHRONOLOGICAL EVENTS OF THE ASEAN TALENT MOBILITY PROGRAMME**

Timeline	Event	Significance
2011/ 01	Malaysia government established TalentCorp under the Prime Minister’s department to tackle brain drain problems via the Returning Expert Programme for Malaysians who migrated abroad and wish to return to work in Malaysia.	Returns of top Malaysian talent professions such as engineers, doctors, and bankers from Singapore, China, UK and other countries. There are 4,121 approved cases up to 2016 (source: TalentCorp Website).
2013 - 2014	Thailand Industrial Technology Assistance Programme (ITAP) started to mobilise S&T experts from government agencies and universities to assist in R&D in SMEs.	Pilot phase of Thailand Talent Mobility (TTM) programme.

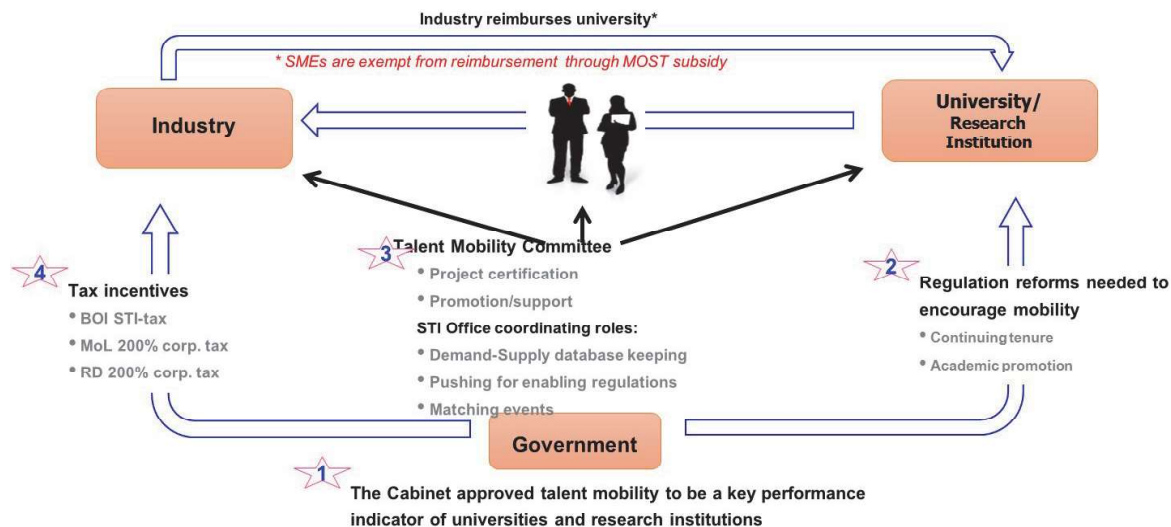
Timeline	Event	Significance
2013/ 11	The ASEAN Talent Mobility (ATM) Project proposal proposed by National Science Technology and Innovation Policy Office of Thailand (STI) to organise the 1 <sup>st</sup> ATM Workshop was approved by the 66 <sup>th</sup> -COST and 15 <sup>th</sup> -AMMST meetings in Malaysia to be funded by the ASEAN Science Fund (ASF).	The start of ATM programme. Top regional policy makers approved and support of the launch of ATM programme.
2014/ 03	The 1 <sup>st</sup> ATM Workshop was organised in Phuket, Thailand. The 40 invited experts and participants were from public, private and academia organisations in ASEAN and dialogue partners including A*STAR, TalentCorp, Fraunhofer, EURAXESS, Western Digital (Thailand) Co. Ltd., the ASEAN Secretariat, and ASEAN COST member representatives.	The beginning of ATM collaborative network of public-private-academia experts. Conclusions and insights gained from the workshop were reported to COST for further endorsements.
2014/ 06	The first Thailand Talent Clearing House or service centre was established to facilitate matching industry demands of talents and experts from public agencies and universities.	Case example of cross-sectoral collaborative network between private firms and academia mediated by public agency.
2014/ 08	The 68 <sup>th</sup> –COST and 8 <sup>th</sup> –IAMMST meetings in Indonesia endorsed the proposal to conduct a survey: Study on the State of ASEAN Talent Mobility (ATM) and the 2 <sup>nd</sup> and 3 <sup>rd</sup> ATM workshops. The ATM projects would be funded by the ASF.	Top regional policy makers approved and continued the support of the Study on the State of ATM project.
2014/ 09	Thailand Talent Mobility (TTM) and ATM managers and researchers visited TalentCorp in Malaysia to learn how it is managed and operated.	Exchanges of best practices and knowhow among the network of ATM researchers.
2014/ 11	The 2 <sup>nd</sup> ATM Workshop was organised in Bangkok, Thailand. The event was attended by the ATM focal points from the AMS and experts from China and EURAXESS.	The scope of the ATM project and survey was defined. ATM collaborative network expanded to include ASEAN-China.
2015/ 02 – 2015/ 04	The ATM working group researchers from Thailand visited national ATM project focal points and talent management experts in Cambodia, Lao PDR, Vietnam, and Indonesia for in-depth interviews and focus group meetings.	Data collection and survey of the ATM project.



Timeline	Event	Significance
2015/ 04	Launch of ATM website: <a href="http://www.aseantalent.net">www.aseantalent.net</a> to be an information sharing platform and linkage among all the ATM focal points and members.	Official website of ATM was established.
2015/ 05	The 3 <sup>rd</sup> ATM workshop was organised in Phuket, Thailand prior to the 69 <sup>th</sup> COST meeting at the same venue. The event was attended by the ATM focal points from the AMS and experts from South Korea and Taiwan.	Findings and policy recommendations from the ATM project were reported to the 69 <sup>th</sup> COST to establish the ATM committee and coordination platform.
2015/ 11	The 70 <sup>th</sup> -COST and 16 <sup>th</sup> -AMMST meeting in Lao PDR endorsed the ASEAN Plan of Action on Science Technology and Innovation (APASTI) 2016-2025. ATM is among one of the four strategic thrusts of APASTI.	Case example of how international collaborative network of ATM programme led to new top-down regional policy and implementation plan.
2016/ 10	The 9 <sup>th</sup> – IAMMST in Brunei Darussalam endorsed the APASTI Action Plan (AIP) (2016-2025). Implementation of ATM programme is among one of the top priority projects in AIP.	ATM programme is part of the Open Innovation initiative in the AIP.
2016/ 11	Indonesian Institute of Sciences (LIPI) visited STI office and NSTDA to learn about Thailand Talent Clearing House and its operations.	Knowledge exchange among ATM international collaborative network.

Talent mobility is defined as “the physical mobility of talent within or across organizations and industries as well as the professional movement of workers across occupations or skill sets. Mobility may be temporary or permanent and may also involve moving people from unemployed to employed, moving jobs to people or allowing for virtual mobility” (World Economic Forum, 2012). STI started to pilot the mobilisation of S&T experts (Industrial Technology Advisors - ITAs) in 2013 from public universities and government agencies under NSTDA’s Industrial Technology Assistance Programme (ITAP) to assist SMEs with R&D and technical problems. Subsequently, the first Talent Mobility Clearing House or intermediary centre between private firms and researchers in public agencies and universities was set up in 2014 to facilitate the mobility process. The rationale of cross-sectoral talent mobility is that the number of R&D personnel in Thailand is low (13.6 per 10,000 population in 2014 according to STI) and most researchers are in universities and government agencies instead of private sector where their expertise is needed. The talent mobilisation period can be up to two years and the university is compensated for by 1.5 times the monthly salary of the mobilised researcher. The mechanism of TTM programme is shown in Figure 1.

**FIGURE 1  
THAILAND TALENT MOBILITY PROGRAMME**

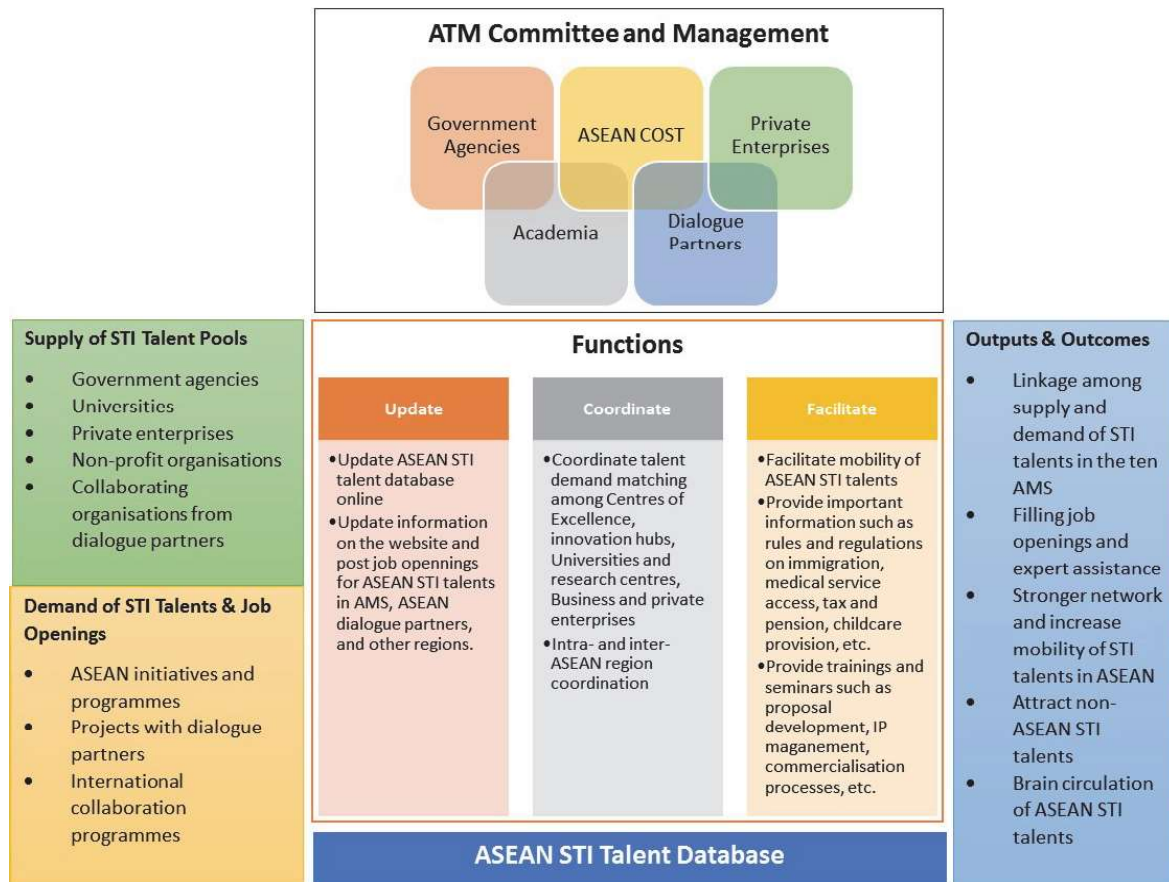


Source: National Science Technology and Innovation Policy Office, Ministry of Science and Technology, Thailand

TTM programme was expanded to include more partnerships with research universities across Thailand after it was formally endorsed by the Thai government cabinet in 2015. Currently, there are four clearing house centres and over 200 researchers have been mobilised to the industry (Kitipongwatana et al., 2016). TTM database also became part of the Strategic Talent Center (STC) (<http://www.boi.go.th/stc/>) established by Board of Investment (BOI) in 2017 to identify domestically available talents and a mechanism for recognising the qualifications of foreign experts and facilitating their visa/ work permit applications.

While developing the TTM programme nationally, STI also initiated the ATM programme in 2014 with its international collaborative network in the ASEAN Committee on Science and Technology (COST) under the ASEAN Ministerial Meeting on Science and Technology (AMMST), which is one of the high-rank official committees under the ASEAN Economic Community (AEC) pillar. The ultimate goal of the ATM programme is to set up and connect a network of science, technology and innovation talents across ASEAN. This is similar to the concept of the European EURAXESS, which is a pan-European initiative that delivers information and support mobility services to professional researchers. Three ATM workshops were held that led to the Study on the State of ATM to survey the stocks and flows of S&T talents in ASEAN and the motivations for them to mobilise. The findings from the study was reported to COST and AMMST and the setup of the ATM collaboration platform was proposed as shown in Figure 2.

**FIGURE 2**  
**PROPOSED ASEAN TALENT MOBILITY COLLABORATION PLATFORM**



Source: *Study on the State of ASEAN Talent Mobility 2016 report*, National Science Technology and Innovation Policy Office, Ministry of Science and Technology, Thailand

International multilevel collaborative network of experts and researchers in talent mobility was established during various technical visits and meetings among Malaysia TalentCorp, TTM management, Indonesia LIPI, A\*STAR, ATM focal points, and dialogue partners from EURAXESS, Fraunhofer, China, and South Korea. After the endorsement from the 16th-AMMST in 2015 and 9th-IAMMST in 2016, the ATM programme is now part of the strategic thrusts of the APASTI 2016-2025 and the Open Innovation initiative in the APASTI Implementation Plan (AIP). The ATM case example illustrates how new initiative in collaboration with international network of COST and linkages to outside experts in academic and private sector can affect the mandate and administration of the associated organisations and personnel in the programme.

According to our definitions of public sector innovation and innovativeness, if we view the ATM programme management team as an organisational unit, the ATM initiative (*a new idea*) was first introduced by STI, endorsed by AMMST (*leadership support and commitment*) and resulted in new collaborative research i.e. the Study on the State of ATM (*implementation of a new idea*), best practice exchanges via technical visits and workshops (*improved organisational learning capability*), and in turn lead to new top down policy implementations in APASTI and AIP (*regional policy outcome*). In this case, COST was *open to new idea* proposed by Thailand. The ATM management team must be *competent and committed to achieve successful outcome by utilisation of collaborative network and linkages with sufficient resources*. All the italic words shown here underlie the elements of innovation and innovativeness from the definitions.

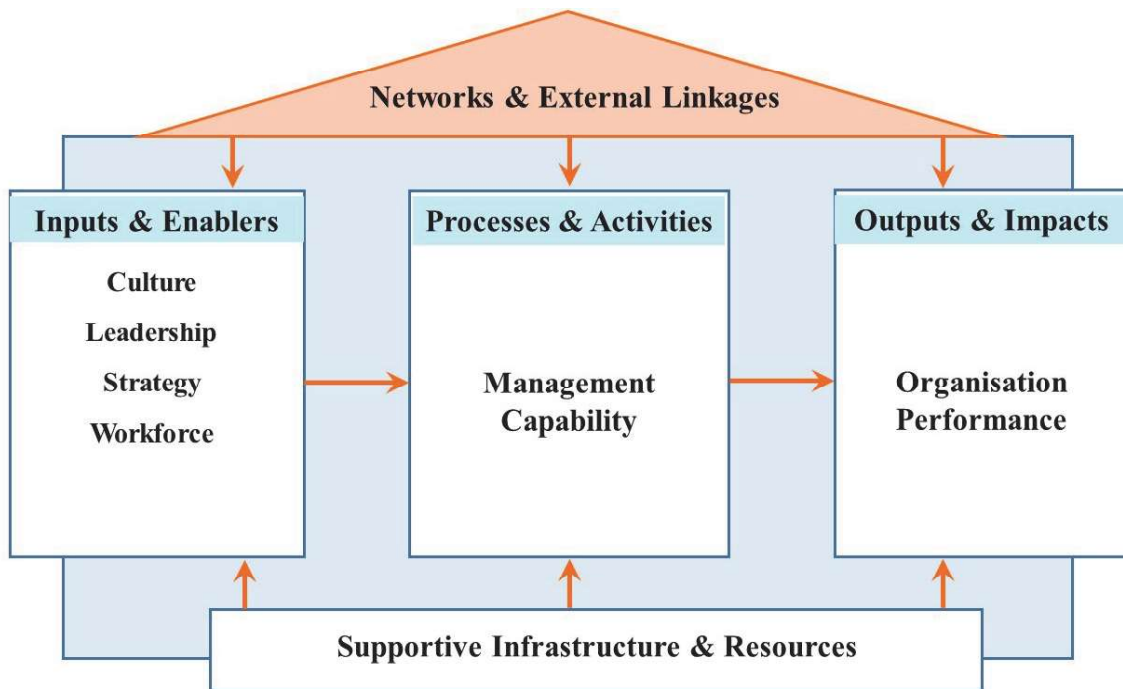
## CONCLUSION

Based on the literature reviews of organisational innovation and innovativeness as well as the qualitative analysis of the ATM programme as case study, we propose the conceptual framework model for measuring organisational innovativeness as shown in Figure 3. The model is based on the IPO approach of organisational management and consists of eight multidimensional factors as follows:

1. *Culture Innovativeness* is the organisational norms and climates that encourage innovation, communication, and improve performance. These include openness, creativity, willingness and adaptability to change and challenges, organisational learning, knowledge sharing, risk taking, and failure tolerance (Ruvio et al., 2013; Martins & Terblanche, 2003; and Ginevičius & Vaitkūnaite, 2006). Innovative culture serves as a catalyst of innovations, while lacking it acts as blocker of innovations (Wang & Ahmed, 2004).
2. *Leadership Innovativeness* refer to organisation leaders' attitudes and behaviors toward innovation that can transform organisation capability and performance. Innovative leadership is linked to the concepts of transformational leadership (Gumusluoglu & Ilsev, 2009 and Chen et al., 2016), collective leadership (Hammer, 2016, Carson et al., 2007, and Ensley et al., 2003), and commitment to innovation.
3. *Strategy Innovativeness* refers to the ability of an organisation to manage ambitious organisational objectives, identify existing gaps and challenges, and leverage limited budget and resources effectively to achieve desirable results (Markides, 1998 and Wang & Ahmed, 2004). Indicators of strategic innovativeness include explicit strategy for competitiveness, shared visions, goals and directions, clear plan and action towards targets, and policy coherence.
4. *Workforce Innovativeness* refers to staff's competency, capability, and devotion to innovation. Having diversified qualifications, experienced, capable and talented workforce has been shown to be positively linked to innovation development (Caird et al., 2013).
5. *Infrastructure and Resource Innovativeness* refers to the ability of the organisation to allocate, leverage, and maximize its resources and intellectual capital such as budgets and funds, ICT investments, R&D, and accumulated knowledge to create innovation, new knowledge, and improve efficiencies and performance of the organisation.
6. *Management Innovativeness* refers to the capability and practice of the organisation management teams in using new public management approaches, knowledge management, organisational learning, and absorptive capacity to improve innovation processes, exploit the human capital and resources, challenge existing structure and framework conditions within the organisations in order to be more productive and improve services. Management innovativeness also includes how the organisation manages new ideas, implement practices and diffuse what works within the organisations to facilitate the process of organisation administration and management (EPSIS, 2013 and DIISR, 2011c).
7. *Performance Innovativeness* can be measured based on how the outputs and outcomes of the projects and services of the public organisation are handled and monitored in order to ensure that the organisation meets its targets and goals. Innovative organisations have reliable performance management system in place, seek to incorporate performance measurement effectively into its day-to-day operations, and refine existing performance measurement system when necessary to reflect changing national policies, strategic agendas and solving social problems (Wolk et al., 2009). The performance indicators include tangible and intangible outputs achieved, performance monitoring and evaluation, performance assessment in comparison with other peer organisations.
8. *Network and External Linkage Innovativeness* refers to utilisation of collaborative networks and alliances; and favorable policy, political and legislative conditions for innovation to improve services and performance. Collaborative network nationally and international with other public agencies, private sector and academia can enhance innovative capability and help

shared resources to achieve shared targets. External context can interfere with how the organisation handles its innovation processes and implementations and can be both drivers and barriers to organisational innovativeness depending on how the circumstances are managed (DIISR, 2011c).

**FIGURE 3**  
**CONCEPTUAL FRAMEWORK MODEL WITH EIGHT MULTIDIMENSIONAL FACTORS**  
**FOR MEASURING ORGANISATIONAL INNOVATIVENESS IN PUBLIC ORGANISATIONS**



The proposed conceptual framework model will be tested and validated via a quantitative empirical survey among the public organisations in ASEAN member countries. The hypotheses are that the organisational innovativeness construct consist of these eight distinct components that are correlated and interlinked to one another and that the covariance among all of the item statements can be accounted for by a single overall organisational innovativeness factor.

It should be noted that some of the factors in the proposed model are overlapped with the seven categories of the quality management standard of the Public Sector Management Quality Award (PMQA) namely leadership, strategy, stakeholder, knowledge management, human resource management, process management, and result and performance management. The PMQA criteria is widely used in Thailand as a guideline for an organisation self-assessment and as a standard of its own performance monitoring and evaluation processes (Wipulanusat & Sunkpho, 2013). We also compare the proposed eight factors with the previous frameworks for measuring innovation and innovativeness as shown in Table 2.

**TABLE 2**  
**DIFFERENT DIMENSIONS OF EXISTING FRAMEWORKS FOR MEASURING**  
**PUBLIC SECTOR INNOVATION AND ORGANISATIONAL**  
**INNOVATIVENESS CONSTRUCTS**

Dimension	Korea GII (2005)	MEPIN (2011)	UK PSII (2011)	APSII (2012)	EPSIS (2012)	Open2-Innovation	Wang & Ahmed (2004)	Lynch et al. (2010)	Moos et al. (2010)	Skerlavaj et al. (2010)	Onag et al. (2014)	Suwan-nathat et al. (2012& 2015)
Culture innovativeness	●	●	●	●	●		●	●	●	●	●	●
Leadership innovativeness	●	●	●	●	●		●		●	●	●	●
Strategy innovativeness	●	●	●	●	●			●				●
Workforce innovativeness	●	●	●	●	●	●				●	●	●
Infrastructure and resource innovativeness	●	●	●	●	●	●			●			●
Management innovativeness	●	●	●	●	●		●			●	●	●
Performance innovativeness	●	●	●	●	●	●				●		●
Network and external linkage innovativeness	●	●		●	●	●				●	●	
Designed for public sector	●	●	●	●	●							●
Designed for private sector						●	●	●	●	●	●	

As evidence from Table 2, all of the eight factors of organisational innovativeness proposed in our conceptual model are also present in the previous well-known measurement frameworks of public sector innovation except in the UK PSII (2011) in which the network and external linkages factor is not included. On the contrary, all of the organisational innovativeness constructs from our literature reviews lack at least one or more of the proposed eight factors. Therefore, it can be concluded that our proposed measurement framework model for measuring public organisational innovativeness is comparable to those previous well known national and regional public sector innovation surveys and offers good coverage of the relevant factors that are covered in the detailed open-ended survey questionnaires.

The public sector organisational innovativeness measurement model and constructs proposed in this study will be developed into a relatively quick and easy to use online self-assessment tool for assessing organisational innovativeness of public agencies in ASEAN. Findings and insights gained from this study also help contribute to closing the knowledge gap in organisational innovativeness of public sector in developing economies.

## ACKNOWLEDGEMENTS

The authors wish to thank the National Science Technology and Innovation Policy Office (STI), the ATM programme management team, the COST representatives, and the ASEAN Secretariat for insightful discussions that provide valuable data and primary information regarding the activities of COST and its subsidiaries that help contribute to this research project.

## REFERENCES

- Annerstedt, P., & Bjorkbacka, R. (2010). *Feasibility study of public sector organisations*. The paper is part of the output from the joint Nordic research project 'Measuring innovation in the public sector in the Nordic countries (MEPIN): Toward a common statistical approach' (Copenhagen Manual).
- Armbuster H., Bikfalvi A., Kinkel, S., & Lay G. (2008). Organisational innovation: The challenge of measuring non-technical innovation in large-scale surveys, *Technovation*, 28, 644-657.
- ASEAN Plan of Actions on Science Technology and Innovation (APASTI) 2016-2025. (2015). Retrieved from [http://www.mih.gov.kh/File/UploadedFiles/7\\_6\\_2016\\_3\\_50\\_0.pdf](http://www.mih.gov.kh/File/UploadedFiles/7_6_2016_3_50_0.pdf).
- Australian Government Empowering Change: *Fostering Innovation in the Australian Public Service*. (2010). Commonwealth of Australia 2010. ISBN 978-0-642-72633-9.
- Avlonitis, G.J., Kouremenos, A., & Tzokas, N. (1994). Assessing the innovativeness of organizations and its antecedents: project Innovstrat. *European Journal of Marketing*, 28(1), 5-28.
- Bloch, C. (2010). *Towards a conceptual framework for measuring public sector innovation*. The paper is part of the output from the joint Nordic research project 'Measuring innovation in the public sector in the Nordic countries (MEPIN): Toward a common statistical approach' (Copenhagen Manual).
- Bloch, C. (2011). *Measuring public sector innovation in the Nordic countries (MEPIN)*. Copenhagen Manual.
- Bloch, C., & Bugge, M. M. (2013). Public sector innovation – From theory to measurement. *Structural Change and Economic Dynamics*, 27, 133-145.
- Bugge, M. M., Hauknes, K., Bloch, C., & Slipersater, S. (2011). *The public sector in innovation system: module 1 – conceptual framework*. The paper is part of the output from the joint Nordic research project 'Measuring innovation in the public sector in the Nordic countries (MEPIN): Toward a common statistical approach' (Copenhagen Manual).
- Caird, S. Hallett, S., & Potter, S. (2013). The Open2-Innova8ion Tool – A Software Tool for Rating Organisational Innovation Performance. *Technovation*, 33(10-11), 381-385.
- Carson, J. B., Tesluk, P. E. & Marrone, J. A. (2007). Shared leadership in teams: an investigation of antecedent conditions and performance. *Academy of Management Journal*, 50(5), 1217-1234.
- Daft, R. L. (1982). A dual-core model of organizational innovation. *Academy of Management Journal*, 21(2), 193–210.
- Chen L., Zheng, W., Yang, B., & Bai, S. (2016). Transformational leadership, social capital and organizational innovation. *Leadership & Organization Development Journal*, 37(7), 843-859.
- Daglio, M., Gerson D., & Kitchen H. (2015). *Building organisational capacity for public sector innovation*, background paper prepared for the OECD conference "Innovating the Public Sector: from Ideas to Impact", Paris, 12-13 November 2014.
- Damanpour, F. (1987). The adoption of technological, administrative and ancillary innovations: impact of organizational factors. *Journal of Management*, 13(4), 675–688.
- Damanpour, F. (1991). Organizational innovation: a meta-analysis of effects of determinants and moderators. *Academy of Management Journal*, 34(3), 555-590.
- Damanpour, F. (1992). Organizational size and innovation. *Organization Science*, 13(3), 375-402.
- Damanpour, F., & Evan, W. M. (1984). Organizational innovation and performance: the problem of "Organizational Lag". *Administrative Science Quarterly*, 29, 392–409.

- Denison, D. R., & Spreitzer, G. M. (1991). Organisational culture and organisational development: a competing values approach. *Research in Organizational Change and Development*, 5, 1-21.
- Department of Innovation Industry, Science and Research (DIISR), Australia Government (April 2011)a. *Measuring Innovation in the Public Sector: A Literature Review*, The Australian Public Sector Innovation Indicators (APSII) Project. Retrieved from <https://innovation.govspace.gov.au/files/2011/08/Literature-review-APSII.pdf>.
- Department of Innovation Industry, Science and Research (DIISR), Australia Government (June 2011)b. *Measuring Innovation in the Australia Public Sector, Consultation Paper 1.0*, The Australian Public Sector Innovation Indicators (APSII) Project. Retrieved from <https://innovation.govspace.gov.au/files/2011/08/APSII-Consultation-Paper.pdf>.
- Department of Innovation Industry, Science and Research (DIISR), Australia Government (June 2011)c. *Working Towards a Measurement framework for Public Sector Innovation in Australia: A Draft Discussion Paper for the Australian Public Sector Innovation Indicators (APSII) Project*. Retrieved from <https://innovation.govspace.gov.au/files/2011/08/APSII-Draft-Discussion-Paper.pdf>.
- Ensley, M. D., Pearson, A., & Pearce, C. L. (2003). Top management team process, shared leadership, and new venture performance: a theoretical model and research agenda. *Human Resource Management Review*, 13(2), 329-346.
- European Public Sector Innovation Scoreboard (EPSIS)*. (2013). Hollanders, H., Arundel, A., & Buligescu, B. *et al.* European Commission.
- Ginevičius, R., & Vaitkūnaite, V. (2006). Analysis of organizational culture dimensions impacting performance. *Journal of Business Economics and Management*, 7(4), 201-211.
- Glor, E. D. (2001, March). Key factors influencing innovation in government. *The Innovation Journal: The Public Sector Innovation Journal*, 6(2).
- Glor, E.D. (2015). Building theory of organizational innovation, change, fitness and survival. *The Innovation Journal*, 20(2), *The Public Sector Innovation Journal*.
- Gumusluoglu, L., & Ilsev, A. (2009). Transformational leadership, creativity, and organizational innovation. *Journal of Business Research*, 62(4), 461-473.
- Halvorsen, T., Hauknes, J., Miles, I., & Roste, R. (2005). *Innovation in the public sector: on the different between public and private sector innovation*. PUBLIN Report No. D9.
- Hammer, B. (2016). *A contemporary conceptualisation of public sector leadership*. Public Sector Management and Not-for-Profit, Competitive Session, ANZAM Conference 2016.
- Hood, C. (1991). A Public Management for All Seasons? *Public Administration*, 69, 3-19.
- Hult, G.T.M., Hurley, R.F., & Knight, G.A. (2004). Innovativeness: its antecedents and impact on business performance. *Industrial Marketing Management*, 33(5), 429–38.
- Hurley, R., & Hult, G. T. M. (1998). Innovation, market orientation, and organizational learning: An integration and empirical examination. *Journal of Marketing*, 62(3), 42–54.
- Innobarometer 2010 Analytical report: innovation in public administration*. (2010). Flash Eurobarometer 305 – The Gallup Organisation. European Commission.
- Jorgensen, L. L. (2010). *Mapping user needs*. The paper is part of the output from the joint Nordic research project ‘Measuring innovation in the public sector in the Nordic countries (MEPIN): Toward a common statistical approach’ (Copenhagen Manual).
- Kamaruddeen, A. M., Yusof, N. A., & Said, I. (2010). Innovation and innovativeness: difference and antecedent relationship. *The IUP Journal of Architecture*, 2(1), 66-78.
- Kattel, R., Cepilovs, A., Drechsler, W., Kalvet, T., Lember, V., & Tonurist, P. (2014). Can we measure public sector innovation? A literature review. *LIPSE Working papers (No.2)*. Erasmus University Rotterdam. The 7th Framework Programme of the European Union.
- Kim, S. E., Lee, J. W., & Kim, B. S. (2007). *The quality of management and government innovation: an empirical study*, paper for presentation at the 9<sup>th</sup> Public Management Research Conference, University of Arizona, 25-27 October 2007.



- Kitipongwatana, A., Kaweekijmanee, K., Wiarachai, O., & Koseeyaporn, P. (2016). *An Empirical Study of Policy Implementation of Thailand Talent Mobility Programme*. Presented at the 13<sup>th</sup> International Conference ASIALICS 2016, Bangkok, Thailand.
- Liao, S. H., Fei, W. C., & Liu, C. T. (2008). Relationships between knowledge inertia, organizational learning and organizational innovation. *Technovation*, 28(4), 183–195.
- Lundvall, B. A. (2015). *The origins of the national innovation system concept and its usefulness in the era of the globalizing economy*. Paper prepared for presentation at the 13<sup>th</sup> Globelics Conference 2015 in Havana September 23-26.
- Lynch, P., Walsh, M. M., & Harrington, D. (2010). Defining and Dimensionalizing Organisational Innovativeness. *International CHRIE Conference-Refereed Track 18. 2010 ICHRIE Conference*.
- Martins, E. C. & Terblanche, F. (2003). Building organisational culture that stimulates creativity and innovation. *European Journal of Innovation Management*, 6(1), 64-74.
- McDermott, C. M. & Stock G. N. (1999). Organizational culture and advanced manufacturing technology implementation. *Journal of Operations Management*, 17(5), 521-533.
- Mortensen, P. S. (2010). *Survey methodology for measuring public innovation*. The paper is part of the output from the joint Nordic research project 'Measuring innovation in the public sector in the Nordic countries (MEPIN): Toward a common statistical approach' (Copenhagen Manual).
- NESTA (March 2011). Hughes, A., Moore, K. & Kataria, N. Innovation, *Innovation in Public Sector Organisations: A Pilot Study Survey for Measuring Innovation Across the Public Sector*.
- OECD (1997). *National Innovation Systems*. Retrieved from <https://www.oecd.org/science/inno/2101733.pdf>.
- OECD Oslo Manual. (2005). *The measurement of scientific and technological activities: guidelines for collecting and interpreting innovation data*. Third Edition.
- Onag, A. O., Tepeci, M., & Basalp, A. A. (2014). Organizational learning capability and its impact on firm innovativeness. *Procedia Social and Behavioral Sciences*, 150(2014), 708-717.
- Rodriguez, V., & Soeparwata, A. (2012). ASEAN benchmarking in terms of science, technology, and innovation from 1999 to 2009. *Scientometrics*, 92, 549–573.
- Roessner, J. D. (1977). Incentives to innovate in public and private organisations. *Administration and Society*, 9, 341-365.
- Ruvio, A. A., Shoham, A., Vigoda-Gadot, E., & Schwabsky, N. (2013). Organizational innovativeness: construct development and cross-cultural validation. *Journal of Product Innovation Management*, 31(5), 1-19.
- Škerlavaj, M., Indihar Štemberger, M., Škrinjar, R., & Dimovski, V. (2007). Organizational learning culture – The missing link between business process change and organizational performance. *International Journal of Production Economics*, 35(3), 346–367.
- Skerlavaj, M., Song, J. H., & Lee, Y. (2010). Organisational learning culture, innovative culture and innovations in South Korea firms. *Expert Systems with Applications*, 37, 6390 – 6403.
- Suwannathat, P., Decharin, P., & Vatanawood, W. (2012). Performance measurement system in the public organizations: a framework and its application. *International Journal of Computer Applications*, 45(21), 33-37.
- Suwannathat, P., Decharin, P., & Somboonsawatdee, A. (2015). Fostering innovation in public organization in Thailand. *International Journal of Organizational Analysis*, 23(4), 528-544.
- Thenint, H. (2010). Mini study 10 innovation in public sector, *Global Review of Innovation Intelligence and Policy Studies*, INNO GRIPS.
- Tsai, C. T. (1997). *Relationship between organizational factors, creativity among members and organizational innovations*. PhD thesis. Taipei, Taiwan, ROC: Business School, Taiwan University.
- Wang, C. L. & Ahmed, P. K. (2004). The development and validation of the organisational innovativeness construct using confirmatory factor analysis. *European Journal of Innovation Measurement*, 7(4), 303-313.

- Windrum, P. (2008). Innovation and entrepreneurship in public services, P. Windrum, & P. Koch (Eds.), *Innovation in Public Sector Services*. Edward Elgar, Cheltenham.
- Wipulanusa, W. & Sunkph, J. (2013). Quality assessment in public sector: a view from public sector management quality award. *Proceedings of the 4th International Conference on Engineering, Project, and Production Management (EPPM 2013)*, 1138 – 1147.
- Wolk, A., Dholakia, A., & Kreitz, K. (2009). *Building a Performance Measurement System: Using Data to Accelerate Social Impact*. A Root Cause How to Guide, Cambridge, MA, USA. ISBN: 978-0-615-31022-0, Library of Congress Catalog Number: 2009907518.
- World Economic Forum (2012). *Talent Mobility Good Practices - Collaboration at the Core of Driving Economic Growth*.
- Yoon, J. I. (2006). *Korean government innovation: strategies and methodologies for administrative innovation*, Fifth Meeting of the Committee of experts on Public Administration, United Nations, New York 27-31 March 2006.