ICT Readiness Assessment Model for Public and Private Organizations in Developing Country

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Abstract— **Information and communication technology (ICT) generates rapid changes of business processes throughout the world, especially in developing counties. Basis of ICT development is composed of ICT infrastructure, ICT hardware, software & information system, and people. ICT strategies and ICT plans should be evaluated to align with organization visions and missions in order to achieve effective use of ICT in their businesses. The present readiness assessment tools called E-readiness assessment tools and models have been developed and are used for large scale organizations or at country level. These tools, however, still have limitations and are un-suitable for small and medium organizations, in which 80% of public and private organizations in developing counties are classified as small/medium organizations. As a result, few organizations can use these tools to identify ICT readiness and management frameworks for their business alignment. This paper presents an ICT readiness assessment model specifically designed to measure readiness of ICT utilization levels and ICT penetration levels in small and medium sized organizations in developing countries. Researchers selected 17 of government business departments in Thai justice system to represent public organizations and 12 of the 3rd party logistics companies in Thailand to represent private organizations in a developing country. These organizations are classified as small/medium sized organization according to the European Commission's recommendation in 2003. This ICT readiness assessment model can help to provide frameworks and critical indicators that are suitable for small and medium organizations in both public and private sectors. The ICT readiness assessment model includes 15 critical indicators, mathematical models, ICT development factors, and ICT readiness interpretation guidelines.**

Index Terms—**ICT Readiness Assessment, ICT Development Factor, Small and Medium sized Business**

I. Introduction

Information and communication technology (ICT) has been implemented worldwide in many types of organizations. ICT is a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information [1]. It allows organizations to collaborate and exchange information at a large scale.

ICT development is composed of ICT infrastructure, ICT hardware, software & information system, and people. These are cornerstones for the development of ICT in organizations. Organizations are using ICT as a tool to run businesses, to support work, and to serve customers, which must work within their strategies and master plans. Therefore, organizations should evaluate their ICT strategies and ICT master plans with respect to organizational plans. Working models must be adapted to harmonize with any necessary factors to achieve sustainable and sufficient development of ICT in organizations.

Readiness assessment tools related to ICT have been developed and used in many organizations. These tools, however, are not suitable for use to assess small and medium sized organizations, especially in developing counties. These assessments tools called E-readiness assessment tools and models. They also provide a useful guide for multinational enterprises who are seeking to invest in technologically innovative countries and tailor their Internet strategies to local conditions.

The ICT readiness assessment model is an evaluation tool, which has the purpose to measure the current state of ICT utilization and ICT penetration levels of medium and small sized business organizations. The results from using the model will be defined as the capability to successful adoption, utilization, and benefit from information and communication technology of assessed organizations. The model provides frameworks and critical indicators, which had been derived from macro perspective models.

Small and medium sized organizations can be classified in two main sectors: public and private. Most organizations in developing countries – such as P.R. China, India, Indonesia, and Thailand – have already adopted ICT for their businesses and services, but there are few organizations which perform self-evaluation of ICT readiness levels, ICT strategies, and ICT master plans. The ICT readiness assessment model proposes essential indicators, which can be associated with critical ICT development for small and medium sized organizations in public and private sectors.

To reduce number of indicators in the model, this paper used a principle component analysis (PCA) method for indicator reduction during data analysis process. PCA provides mathematical values of interrelationships between indicators by using mathematical and statistical methods. It is used to create a new set of indicators which were later proven to be suitable for small/medium sized organizations. This statistical technique is used for clarity in data in such a way as to emphasize their similarities and differences. Data are evaluated and assigned with real numbers with a range from one to five [1 to 5]. The values of the numbers also have different meanings according to the proposed model. Then, descriptions of the assigned number in each indicator will be used to design ICT development guidelines. The new set of indicators will become critical ICT developing indicators of the particular organizations. They are also used to declare ICT readiness of small and medium organizations in developing counties.

The main objective of this research is to develop an ICT readiness assessment model that is suitable for evaluating ICT readiness for small and medium sized organizations in both public and private sectors. Also, the model must be

Manuscript received May 31, 2011.

suitable for using in developing countries.

II. Reviews of e-Readiness Assessment Tools

E-readiness is a measuring tool, which is used to evaluate the quality of ICT infrastructure at the nation level or in large sized organizations. It can evaluate the ability of consumers, businesses and governments to utilize ICT to their benefit. However, this research focused only on ICT assessment tools, which present methodologies as follows:

A. Ready-to-use tools – questionnaires

These tools produce scores or ratings including definitions. There are few tools freely available on the Internet. In this research, the following tools were reviewed:

1) Readiness for Networked World: A guide for developing countries [2].
2) E-Commerce Readiness Assessment [3].
3) Readiness Guide for Living in the Networked World [4].

B. Case studies

Case studies are methodologies that implicate an in-depth investigation of single, group, or event. In this research, the reviewed case studies are cases in the ITU case studies [5].

C. Third party surveys and reports

These surveys and reports have an objective to rank and rate countries on various measures that have been held to indicate e-readiness or e-competitiveness. In this research, the third party surveys and reports under reviews are as follows:

1) Risk E-Business's seizing the opportunity of global e-readiness [6]
2) E-readiness ranking [7].
3) Statistical Indicators Benchmarking the Information Society [8].
4) Networked Readiness Index (NRI) [9].

D. Other e-readiness assessment models

The other e-readiness assessment models can be used to evaluate a readiness of adoption and utilization ICT. These models can be described as digital divide reports, and position papers [10].

III. Definition of Small and Medium Organizations in Public and Private Sectors

A. Public Sector

The public sector is comprised of the general government sector, including nationalized industries and services providers. This sector can be defined in a variety of ways. One way is to reason in terms of the status of employees. In this research, public sector definitions are as follows:

TABLE I: The Definition of Small and Medium Organizations in Public Sector

Type	Small	Medium
	Number of Employee	Number of Employee
Head office	51 - 100	201 - 400
Branch office	10 - 50	101 – 200

B. Private Sector

The private sector is an operational organization for private profits, and it is not controlled by the government. In this research, the private sector is based on the number of paid employees and the maximum of enterprise fixed capital. The definitions of the private sector are based on Thai SME definition in 2007 and European Commission recommendation in 2003. The details are as follows:

TABLE II: The Definition of Small and Medium Organization in Private Sector

Type	SMALL		Medium	
	EMPLOYEES	CAPITAL (MILLION BAHT)	Employees	Capital (million baht)
Production	⩽ 50	⩽ 50	51 - 200	51 - 200
Service	⩽ 50	⩽ 50	51 - 200	51 - 200
Wholesale	⩽ 25	⩽ 50	26 - 50	51 - 100
Retail	⩽ 15	⩽ 50	16 - 30	31 - 60

IV. Proposed Model and Indicators

The proposed model is composed of indicators for the four main ICT factors where these four factors contain a total of 16 ICT sub-factors. As a result, the model provides 38 indicators shown in Table III that have been derived from the assessment tools mentioned in the previous section. Figure 1 shows the proposed ICT readiness assessment model.

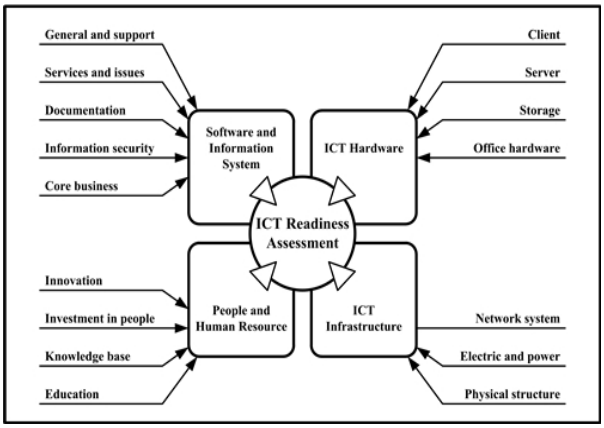

Fig. 1. The Proposed ICT Readiness Assessment Models for small and medium organization in public and private sector.

V. Data Collection and Constraint

The research targets were small and medium sized organizations in developing countries. The model must be suitable for both public and private organizations. The selected organizations must have their own ICT departments and ICT systems. According to the above constraints, researchers selected 17 of government departments in Thai justice system to represent organizations in the public sector and 12 of the 3rd party logistics companies in Thailand to represent organizations in the private sector [11, 12]. The following table is the indicators that are proposed for the model.

TABLE III: PROPOSED ICT READINESS ASSESSMENT INDICATORS

ID.	INDICATOR
ICT INFRASTRUCTURE (I) – NETWORK SYSTEM	
I1.1	NETWORK BACKBONE
I1.2	NETWORK SECURITY
I1.3	NETWORK DEPENDABILITY AND SURVIVABILITY
ICT INFRASTRUCTURE (I) – ELECTRIC AND POWER	
I2.1	ELECTRIC AND POWER SUPPLY SYSTEM
I2.2	ELECTRIC AND POWER BACKUP SYSTEM
I2.3	ELECTRIC AND POWER SAFETY
ICT INFRASTRUCTURE (I) – PHYSICAL INFRASTRUCTURE	
I3.1	DATA CENTER ROOM
I3.2	GENERAL ROOM
I3.3	MANAGEMENT POLICY
ICT HARDWARE (H) – CLIENT	
H1.1	PERSONAL COMPUTER
H1.2	MOBILE AND NOMADIC DEVICES
ICT HARDWARE (H) – SERVER	
H2.1	SERVER FOR INTERNAL USAGE
H2.2	SERVER FOR EXTERNAL USAGE
STORAGE	
H3.1	PERSONAL STORAGE
H3.2	SERVER STORAGE
H3.3	SECONDARY STORAGE
ICT HARDWARE (H) – OFFICE HARDWARE	
H4.1	OPTICAL DRIVE DEVICES
H4.2	INPUT DEVICES
H4.3	OUTPUT DEVICES
SOFTWARE & INFORMATION SYSTEM (S) – CORE BUSINESS	
S1.1	INFORMATION SYSTEMS
S1.2	SOFTWARE
SOFTWARE & INFORMATION SYSTEM (S) – GENERAL AND SUPPORT	
S2.1	INFORMATION SYSTEMS
S2.2	SOFTWARE
SOFTWARE & INFORMATION SYSTEM (S) – SERVICES AND ISSUES	
S3.1	KNOWLEDGE BASE
S3.2	ISSUE HANDLING
SOFTWARE & INFORMATION SYSTEM (S) – DOCUMENTATION	
S4.1	INFORMATION SYSTEMS
S4.2	SOFTWARE
SOFTWARE & INFORMATION SYSTEM (S) – INFORMATION SECURITY	
S5.1	CONFIDENTIALITY
S5.2	INTEGRITY
PEOPLE & HUMAN RESOURCE (P) – INVESTMENT IN PEOPLE	
P1.1	MANAGEMENT ON INVESTMENT
P1.2	TRAINING AND/OR SEMINAR
P1.3	EXAMINATION AND/OR CERTIFICATION
PEOPLE & HUMAN RESOURCE (P) – KNOWLEDGE BASE	
P2.1	KNOWLEDGE RESOURCES
P2.2	KNOWLEDGE MANAGEMENT ENCOURAGEMENT POLICY
PEOPLE & HUMAN RESOURCE (P) – EDUCATION	
P3.1	EDUCATION LEVEL AND RESPONSIBILITY
P3.2	EDUCATION ENCOURAGEMENT POLICY
PEOPLE & HUMAN RESOURCE (P) – INNOVATION	
P4.1	AWARDS
P4.2	INNOVATION ENCOURAGEMENT POLICY

The main data collection method for these indicators is a document review method while observation and interview processes are optional methods. Then, the collected data are processed according to an ICT readiness measurement scores and criteria.

VI. ICT READINESS MEASUREMENT AND SCORE CRITERIA

The ICT readiness assessment model requires the collected data with contain of indicators shown in Table III from all participating organizations. The data were collected using document review, observation, and interview then the data would be evaluated and assigned scores in real numbers. Table IV is description of the scores used for evaluation of ICT readiness in each indicator. Once the scores of the indicators were determined according to the score criteria, an ICT readiness mathematical model would be used for determine the final ICT readiness level of the participating organizations.

TABLE IV: ICT READINESS MEASUREMENT AND SCORE CRITERIA

Score	Mean	Score Criteria
5	Excellent	: There were available and sufficient documents to access score. : Organization had ICT master plan, policy, and management documents: : Organization utilized ICT infrastructure, ICT hardware, software & information system, and people. : Organization utilized ICT master plan, policy, and management. : Organization had monitoring the performance of ICT master plan and policy utilization. : Organization had improvement process of the ICT master plan and policy to align with organization vision and missions.
4	Good	: There were available and sufficient documents to access score. : Organization had ICT master plan, policy, and management documents: : Organization utilized ICT infrastructure, ICT hardware, software & information system, and people. : Organization utilized ICT master plan, policy, and management. : Organization had monitoring the performance of ICT master plan and policy utilization.
3	Average	: There were available and sufficient documents to access score. : Organization had ICT master plan, policy, and management documents: : Organization utilized ICT infrastructure, ICT hardware, software & information system, and people. : Organization utilized ICT master plan, policy, and management.
2	Poor	: There were available documents to access score but insufficient. : Organization had ICT master plan, policy, or management documents: : Organization utilized ICT infrastructure, ICT hardware, software & information system, and people.
1	Fail	: There were unavailable documents to assess score. : Organization has working plan, policy, or management documents.

VII. Mathematical Model of ICT Readiness Level

The results of this mathematical model refer to ICT readiness levels of the participating organizations. The ICT readiness levels also provide ICT factor priority for ICT investment and management. For examples, if ICT infrastructure factor receives the lowest ICT readiness level, it indicates that ICT infrastructure is in the highest priority for ICT investment and management. The mathematical model can provide an overall level of ICT readiness of each organization. The priority and ranking will deliver the awareness levels of ICT factors within organizations. The descriptions are explanation of the factors and ICT readiness levels. The following equation shows the mathematical model of ICT readiness assessment.

$$\text{ICT Readiness level} = \frac{\left(D_i I + D_h H + D_s S + D_p P\right)}{4} \quad (1)$$

Where: D_i = Developing factor of ICT infrastructure factor

I = Average of ICT infrastructure score

D_h = Developing factor of ICT hardware factor

H = Average of ICT hardware score

D_s = Developing factor of software and information system factor

S = Average of software and information system score

D_p = Developing factor of people factor

P = Average of people score

(1) is ICT readiness level that had been calculated by an average of factor scores in which each factor score was multiplied by the developing factors according to each particular ICT factor. The model calculated standard deviation (σ) of ICT readiness level to present the distribution of information and calculated the confidence interval (CI) of the ICT readiness level to ensure that the information was reliable. A confidence interval was an estimation of a parameter shown in (2). In this research, the confidence interval on mean was calculated only in the case that standard deviation was available.

$$l \le \mu \le u \quad (2)$$

where l was a lower limit and u was an upper limit. A confidence interval on mean of population size = n was $\bar{x} \pm z\frac{\sigma}{\sqrt{n}}$ where z was $\frac{(1-\alpha)}{2}$. It was a critical value for standard normal distribution. (3) is the lower and upper limits of μ.

$$\overline{X} - z\frac{\sigma}{n} \le \mu \le \overline{X} + z\frac{\sigma}{n} = (1-\alpha) * 100\% \quad (3)$$

where α was an error risk factor. It indicated the risk of forecasting error of μ. In this research, the error risk factor is 95% of confidence interval with a two-sided confidence interval.

The developing factor was a set of discrete real numbers of 0.8, 1.0, and 1.2. These numbers defined the level of development of ICT in an organization. The developing factors' characteristics were shown in TABLE V.

TABLE V: Developing Point of Factor Scores and Criteria

Point	State	Characteristic
1.2	Progressive	: Clarity on ICT master plan. : Organization vision was composed of brevity, clarity, abstractness, future orientation, stability, and inspiration. : Organization had clarity and possible missions that were in scope of organization work. The missions could be accomplished in the next 5 years. : ICT strategies were harmonized with organization vision and missions. : Clarity on ICT development. : ICT infrastructure management. : ICT hardware management. : Software. : Information system : People management.
1.0	Steady	: ICT master plan. : Organization had vision, missions, and ICT strategies. : ICT development plan. : ICT infrastructure management. : ICT hardware management : Software. : Information system. : People management.
0.8	Regressive	: Organization did not have any ICT plan.

VIII. ICT Readiness Level Interpretation Guideline

ICT readiness levels were composed of specific and generic utilizations of ICT and penetration of ICT in an organization. The ICT readiness levels had defined guidelines for improvement of organizational ICT. It was measured by the achievement of the specific and generic goals associated within each indicator. There were five readiness levels representing layers of ICT management, ICT development, and ICT improvement, which were designated by real numbers of one through five.

TABLE VI presented ICT readiness level characteristics that were used for interpreting the level score into definitions of ICT developing guideline.

TABLE VI: ICT readiness level interpretation guideline

	Characteristics
Level: 5 Mean: Optimized Range: [5, 6] Concerned	: ICT readiness level was most predictable. : ICT management and ICT improvement becomes a way of business life. : Organization management system for ICT management and ICT utilization were aligned with organization ICT master plans, vision, missions, and policies. : Organization could create new ICT knowledge and innovation. : Organization could utilize ICT management system to optimize ICT management and ICT development in an organization. : At ICT readiness level 5, the organization was concerned in improving ICT utilization and ICT penetration rates to optimize ICT master plan & strategies and to achieve sustainable development of ICT in organizations.
Level: 4 Mean: Improved	: ICT readiness level was more predictable. : ICT management and ICT utilization were in a state of continual improvement.

Range: [4, 5) Concerned	: Organization management system for ICT management and ICT utilization were aligned with organization ICT master plans, vision, missions, and policies. : ICT management relied on organization management systems : At ICT readiness level 4, the organization was concerned about monitoring and maintaining the current status of ICT utilization and ICT penetration rates in order to continuing improvement of ICT in organization.
Level: 3 Mean: Maintained Range: [3, 4) Concerned	: ICT readiness level was more predictable. : Organization maintained ICT management and ICT utilization to align with organization ICT master plans, vision, missions, and policies. : Organization had a management system for ICT management and ICT utilization. : ICT management relied on organization management system. : At ICT readiness level 3, the organization was concerned about maintaining of ICT utilization and ICT penetration rates for stability of organization performance.
Level: 2 Mean: Managed Range: [2, 3) Concerned	: ICT readiness level was predictable. : Organization had disciplines in ICT usage. : Some of ICT management relied on individual. ICT management and ICT utilization depended on plans in accordance with organization ICT master plans and policies. : Organization could utilize ICT to meet their ICT master plan, vision, missions, and policy. : Organization ICT management was appropriately controlled. : At ICT readiness level 2, the organization was concerned about utilization of ICT in organization
Level: 1 Mean: Initial Range: [0.8, 2) Concerned	: ICT readiness level was difficult to predict. : ICT management relied on individual. ICT management and utilization depended on competence and performance of staffs/employees in an organization. : Organization could not utilize ICT to meet their ICT master plans, vision, missions, and policies. : At ICT readiness level 1, the organization was not concerned in any areas of ICT development.

IX. Indicator Analysis and Reduction

The researchers analyzed the relationships between 38 indicators that are categorized in four factors. Principal component analysis (PCA) had been implemented. PCA was used to create a new set of indicators that will be critical indicators for ICT developing of small and medium organizations in public and private sectors [13].

The condition for selecting indicators was eigenvalue larger than one and absolute value from covariance matrix of factor loading greater than 0.5. Indicators should have significant factor loading only on one component.

The analytical process includes PCA and identification of the factors. This research used the Kaiser-Meyor-Olkin (KMO) and Bartlett's test to measure sampling adequacy. TABLE VII shows the results of KMO and Bartlett's test.

TABLE VII: KMO and Bartlett's Test a

ICT Infrastructure		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.724
Bartlett's Test of Sphericity	Approx. Chi-Square	121.045
	df	36.000
	Sig.	.000
ICT Hardware		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.742
Bartlett's Test of Sphericity	Approx. Chi-Square	275.858
	df	45.000
	Sig.	.000
Software and Information System		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.637
Bartlett's Test of Sphericity	Approx. Chi-Square	246.233
	df	45.000
	Sig.	.000
People		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.582
Bartlett's Test of Sphericity	Approx. Chi-Square	215.738
	df	36.000
	Sig.	.000
a. Based on correlations		

The Kaiser-Meyor-Olkin (KMO) and Bartlett's test was used to measure sampling adequacy. The KMO of ICT infrastructure, ICT hardware, software & information system, and people were 0.724, 0.742, 0.637, and 0.582 which were greater than 0.5 for a satisfactory factor analysis to proceed.

X. Principal Component Analysis

PCA was used for identifying patterns and clarity in data in such a way as to emphasize their similarities and differences. It reduced data dimensionality by performing a covariance analysis between variables. The following shows how PCA can be used in reductions of indicators in ICT readiness assessment model.

a) Acquire data of all indicators: The data were scored in real numbers with a range from one to five.
b) Subtract the mean values of each particular indicator
c) Calculate the covariance matrix of the scored data
d) Calculate eigenvector and eigenvalues: Since the covariance matrix was a square matrix, it could also be calculated for eigenvectors and eigenvalues.
e) Choosing representative components: Components, which had eigenvalues greater than one, were representatives of critical indicators for ICT readiness.
f) Deriving new data set: This was a final process in PCA. This chose the components that would be critical indicators. This process was to derive a new data set by using the matrix rotation method. The effect of the matrix rotation was to redistribute the variance.

In this research, any indicators, which had an eigenvalue greater than 0.6, will be used as a critical indicator for each particular ICT factor/sub-factor.

XI. Results and Discussions

A. Results of Data Analysis

The calculation showed all the factors extractable from the analysis along with their eigenvalues, the percentage of

variances, and the cumulative percentage of the factors. TABLE VIII showed the factor accounts for percentage of the variances.

TABLE VIII: RESULTS OF DATA ANALYSIS A

ID	Initial Eigenvalues		
	Total	% of variances	Cumulative %
ICT Infrastructure			
1	4.420	49.116	49.116
2	1.247	13.861	62.977
3	.996	11.069	74.045
4	.720	8.002	82.047
5	.554	6.153	88.200
6	.398	4.419	92.618
7	.354	3.931	96.549
8	.205	2.275	98.824
9	.106	1.176	100.000
ICT Hardware			
1	5.656	56.565	56.565
2	1.780	17.798	74.362
3	1.020	10.202	84.564
4	.577	5.771	90.335
5	.403	4.030	94.365
6	.245	2.446	96.811
7	.146	1.463	98.274
8	.106	1.062	99.336
9	.041	.413	99.749
10	.025	.251	100.000
Software and Information System			
1	5.297	52.969	52.969
2	1.921	19.213	72.182
3	1.093	10.928	83.110
4	.714	7.137	90.246
5	.359	3.593	93.839
6	.238	2.375	96.214
7	.156	1.557	97.772
8	.103	1.029	98.800
9	.084	.844	99.644
10	.036	.356	100.000
People			
1	4.475	49.722	49.722
2	2.056	22.842	72.564
3	.971	10.786	83.350
4	.603	6.702	90.053
5	.376	4.181	94.234
6	.215	2.384	96.618
7	.179	1.994	98.612
8	.109	1.216	99.827
9	.016	.173	100.000

a Extraction Method: Principal Component Analysis.

TABLE IX presented factor loading of each variable on the four main factors of the model. Each variable should have significant factor loading only on one component. This research considered the values of the factor loading which were greater than 0.6 for loading.

B. Discussion of New Indicators Set

TABLE X presents a new set of indicators for the ICT readiness assessment model that was composed of identification number (ID) of indicators, name of indicators, and brief description of indicators. By using PCA on the previous set of indicators in Table III, the indicators can be reduced from 38 to 15 indicators.

TABLE IX: ROTATED COMPONENT MATRIX [a]

	COMPONENT			
	1	2	3	4
ICT Infrastructure				
I1.1	.034	.868	.116	.195
I1.2	.118	.236	.211	.892
I1.3	.371	.651	.430	.104
I2.1	.633	.454	.282	.274
I2.2	.795	.244	-.250	.236
I2.3	.827	.225	.171	-.262
I3.1	.359	.793	-.026	.074
I3.2	.839	.075	.376	.251
I3.3	.103	.129	.878	.176
ICT Hardware				
H1.1	.877	.168	.089	-
H1.2	.749	.250	.101	-
H2.1	.380	.841	-.040	-
H2.2	.239	.073	.936	-
H3.1	.921	.266	.205	-
H3.2	.026	.962	.119	-
H3.3	.773	-.397	.129	-
H4.1	.898	.282	.185	-
H4.2	.718	.608	.036	-
H4.3	.652	.428	-.376	-
Software and Information System				
S1.1	.143	.327	.278	.865
S1.2	.680	.621	.011	.284
S2.1	.349	-.215	.676	.528
S2.2	.687	.222	.572	.119
S3.1	.894	.239	.154	-.038
S3.2	.879	.201	.054	.263
S4.1	.045	.082	.964	.129
S4.2	.468	.746	.346	-.004
S5.1	.040	.839	-.228	.349
S5.2	.353	.859	.127	.017
People				
P1.1	.195	.170	.901	.226
P1.2	-.133	.096	.948	.116
P1.3	.162	.881	.164	.060
P2.1	.102	.034	.280	.951
P2.2	.887	.330	.116	.146
P3.1	.790	.511	.053	.095
P3.2	.449	.787	.124	-.023
P4.1	.862	.354	-.045	.017
P4.2	.933	-.013	-.011	.022

"Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization."
a. Rotation converged in 5 iterations.

TABLE X: NEW ICT READINESS ASSESSMENT MODEL INDICATORS SUMMARY

ID	Indicators Name
I	Factor - ICT Infrastructure
I1	Physical Structures (Infrastructure component 1) *I1 referred to general rooms and electric and power systems in an organization.*
I2	Physical Structure Management Policy (Infrastructure component 3) *I2 referred to the management policy of physical structure in an organization.*
I3	Network system and physical location (Infrastructure component 2) *I3 referred to network system, and datacenter in an organization.*
I4	Network Security (Infrastructure component 4) *I4 referred to security policy of network in an organization.*
H	Factor - ICT Hardware
H1	Personal Devices (hardware component 1) *H1 referred to the number of personal devices such as personal computers (PC), printers, scanners, and other ICT hardware in an*

	organization for each person/employee
H2	Private Server (hardware component 2) *H2 referred to the server for internal usage and its data storage in an organization.*
H3	Public Server (hardware component 3) *H2 referred to the server for external usage in an organization.*
S	Factor - Software and Information System
S1	Software and Services of Software (software and information system component 1) *S1 referred to core business software, general & support software, and knowledge & issues handling of software.*
S2	Software Security and Documents (software and information system component 2) *S2 referred to the software confidentiality & integrity and software documents such as manuals, software help documents, and other software documents.*
S3	Information System (software and information system components 4) *S3 referred to the core & support information system in an organization.*
S4	Information System Support and Documents (software and information system component 3) *S4 referred to the support of information systems and documents such as manuals, development documents, and other information system documents.*
P	Factor – People
P1	Human Management Policy (people component 1) *P1 referred to the encouragement policy on human resources in an organization.*
P2	Staff Education and Encouragement (people component 2) *P2 referred to the encouragement for staff improvement, which was education, examination, and certification, in an organization.*
P3	Management of Investment on People (people component 3) *P3 referred to the management of investment in staff in an organization that was composed of plans of training and seminar schedules.*
P4	Organization Knowledge Management (people component 4) *P4 referred to the organization knowledge management, which was developed in an organization.*

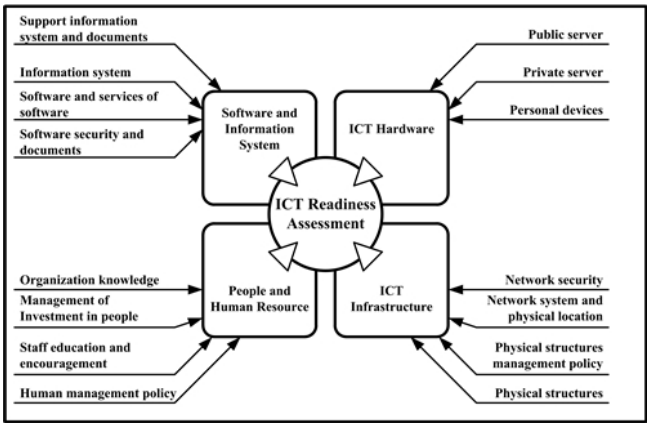

Fig. 2. ICT Readiness Assessment Model for

Small and Medium Organizations in Public and Private Sectors with a new set of indicators

XII. Conclusion

A. ICT Readiness Assessment Model

ICT readiness assessment model was developed and tested with 29 organizations, which were small and medium sized organizations of both public and private sectors in a developing country. ICT readiness assessment scores, levels, and results were presented to all organization representatives, and their CEOs accepted the results of this model. The results were composed of the reasons of problems, ICT readiness scores, and ICT readiness level. Thus, this model was suitable for assessment small and medium organizations in public and private sectors.

B. Benefit of the ICT Readiness Assessment Model

The ICT readiness assessment model is recommended for use in assessment of the ICT readiness in small and medium organizations in a developing country such as Thailand. The model was a result of the collected research data that had been acquired from 29 organizations. The model is composed of 15 critical indicators for evaluating all four main ICT factors: ICT infrastructure, ICT hardware, Information system & software, and People. The ICT readiness level can be used for prioritizing ICT investment and management policies of an organization. The cost of assessment processes is reduced because the numbers of indicators are less than other e-Readiness measurement tools, and the indicators are straightforward which helps reduce complication during data acquisition processes.

Acknowledgment

This research is supported by the Office of the Higher Education Commission and Mahidol University under the National Research Universities Initiative.

The success of this research would not happen without support from the Office of Justice Affairs (OJA), and participation of the third party logistics service providers in Thailand.

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