Benchmarking Open Government Principles: Quantitative Evaluation and Prediction Analysis of Logistics, Health, Agricuture and Economics

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Abstract

The concept of Open Government is a new idea that the cabinet has recently resolved. Government agencies at different levels, including the central government, regional governments, and local governments, have not been aware of this issue. Simultaneously, some of this concept is part of the country management, supported by laws and regulations. The result has not been well achieved as it should be. Disclosure is often limited. This research was conducted to study and analyze the current status of Open Government in improving the quality of public services, and analyze the relationship and data open that affect the four dimensions of an Open Government: Transparency, Open Data, Accountability, and Governance Network in public health, economy, Transport, and Agriculture. To this end, this research offers Thailand's Open Government policy and

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the transaction data from the public manual database's transaction processing and the frequency of data browsing to analyze the gap for Improvement for each dimension in order to improve the quality of operation and public services to support the changes in the future. The key findings illustrated that to promote the Open Government; the government should realize the importance of adopting digital technology in the public administration process by urgently formulating a policy for the development and management of extensive databases which can help analyze and develop public services that respond to the public's needs. Big data is required to support proactive and preventive government policies effectively under the drive to integrate public databases and enhance public services quality, as well as monitor and evaluate the data linkages of various agencies periodically.

Keywords: *Open Government, Integrity and Transparency Assessment, Corruption Perceptions Index, Public Good Governance Indicators, Data Governance for Government*

การเปรียบเทียบตัวชี้วัดตามหลักการบริหารราชการแบบเปิด : การประเมินเชิงปริมาณและการวิเคราะห์เชิงคาดการณ์ กรณีศึกษาด้านสาธารณสุข เศรษฐกิจ การขนส่ง และด้านการเกษตร

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บทคัดย่อ

แนวคิดเรื่องราชการแบบเปิดถือเป็นแนวคิดใหม่ที่คณะรัฐมนตรีเพิ่งมีมติให้เริ่มดำเนินงานได้ไม่นาน หน่วยงานรัฐในระดับต่าง ๆ ทั้งราชการบริหารส่วนกลาง ส่วนภูมิภาค และส่วนท้องถิ่นยังไม่ค่อยมีการตระหนักในเรื่องนี้มากนัก แม้ว่าบางส่วนของแนวคิดนี้เป็นส่วนหนึ่งของการบริหารจัดการบ้านเมืองที่ดี ซึ่งมีกฎหมายและระเบียบต่าง ๆ รองรับ แต่ผลการดำเนินงานยังไม่บรรลุผลเท่าที่ควร ดังจะเห็นว่าหน่วยงานภาครัฐยังไม่สามารถเชื่อมโยงข้อมูลข้ามหน่วยงานได้ทั้งระบบ เนื่องจากอุปสรรคด้านวัฒนธรรมองค์การของภาครัฐเรื่องการหวงข้อมูล งานวิจัยฉบับนี้จึงจัดทำขึ้นเพื่อศึกษาและวิเคราะห์สถานภาพปัจจุบันของบริหารราชการแบบเปิดในการยกระดับคุณภาพการให้บริการสาธารณะ และวิเคราะห์ความสัมพันธ์และความเชื่อมโยงของข้อมูลที่ส่งผลต่อการเป็นการบริหารราชการแบบเปิด ทั้ง 4 มิติ ได้แก่ มิติความโปร่งใส มิติเปิดเผยข้อมูล มิติภาระรับผิดชอบ และมิติการบริหารราชการแบบเครือข่ายของด้านสาธารณสุข เศรษฐกิจ การขนส่ง และด้านการเกษตร วิเคราะห์และเสนอแนะนโยบายการบริหารราชการแบบเปิดของประเทศไทยควบคู่กับข้อมูลการดำเนินการธุรกรรมจากฐานข้อมูลคู่มือสำหรับประชาชน และความถี่ในการเรียกดูข้อมูล

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เพื่อวิเคราะห์แนวทางในการพัฒนาในแต่ละมิติ เพื่อช่วยในการปรับปรุงคุณภาพการดำเนินงานและการให้บริการสาธารณะ สามารถรองรับกับการเปลี่ยนแปลงในอนาคต ผลการศึกษาพบว่า ภาครัฐควรตระหนักถึงความสำคัญของการนำเทคโนโลยีดิจิทัลมาใช้ในกระบวนการบริหารราชการ ด้วยการกำหนดนโยบายเร่งด่วนในด้านการพัฒนาและจัดการฐานข้อมูลขนาดใหญ่ เพื่อใช้ในการวิเคราะห์และพัฒนางานบริการที่ตอบสนองต่อความต้องการของประชาชน ทำให้ภาครัฐมีข้อมูลขนาดใหญ่ที่สามารถสนับสนุนในการกำหนดนโยบายรัฐในเชิงรุกและเชิงป้องกันได้อย่างมีประสิทธิภาพ ภายใต้การขับเคลื่อนแนวทางบูรณาการฐานข้อมูลประชาชนและบริการภาครัฐให้สำเร็จอย่างเป็นรูปธรรม

คำสำคัญ: การบริหารราชการแบบเปิด ตัวชี้วัดการประเมินคุณธรรมและความโปร่งใสในการดำเนินงาน ตัวชี้วัดธรรมาภิบาล ตัวชี้วัดดัชนีการรับรู้การทุจริต ตัวชี้วัดธรรมาภิบาลข้อมูลภาครัฐ

Introduction

The changing context of technological advancement, the more complicated socio-economic situation, the government's operation requires cooperation from different sectors to meet the public's needs. The government must seek a new governance way (Estevez & Janowski, 2013). The government needs to focus on the private sector's participation, the public sector, and the civil society in promoting a participatory governance system toward an Open Government. This will help develop the public's feedback dynamics to establish policy and improve public services to meet the public's needs (OECD, 2018).

The government administration in Thailand was originally focused on bureaucratic polity (Riggs, 1966), or a closed administration system, which later reformed the bureaucratic system by adopting new public management (Hood, 1991) implemented during B.E. 2541-2549 (1998-2006). The concept of private sector management was a new organizational model that was more efficient, independent, and agile. It changed in a way that disaggregates departments from ministries to reduce the government sector's size. However, the concept has been criticized for its emphasis on leaders' role and ignored government’s accountability (Denhardt & Denhardt, 2015; Barzelay, 2001). The advancement of technology also challenged the new concept of government administration in democratic governance (Denhardt & Denhardt, 2011; Dunleavy et al., 2008)

During B.E. 2550 (2007), the New Public Governance (NPG) influenced the bureaucratic reform concept. As society became more diverse, the concept was more focused on the role of the civil society sector and public engagement and the New Public Service concept (NPS). This emphasized the role of digital technology that helped improve public services more efficiently. The improvements could be seen in government processes that adopted technology such as online tax payments, ID cards, mobile utility payments.

Currently, the Government has demonstrated its intention to adopt an Open Government concept, which can be seen in the Kingdom of Thailand's constitution, B.E. 2560 (2017). It has adopted good governance principle, focusing on transparency and accountability of public services, rights to disclose the public data, and civil society's role in the government's policy decision-making process. The state shall listen to the opinions of the concerned persons and consider them in all legal process, whether it is a 20-year national strategy (2018 - 2037), formulation of the 6th strategy on balancing and developing government administration system by allowing the government to adhere to the principle of "Government of the people, for the people and public interests" by following the good governance principle, adjusting the work culture to achieve the overall achievements and benefits, adopting innovation, big data technology, and digital working systems. Also, the cabinet has adopted a resolution on December 4, 2018, and has assigned OPDC to proceed with the participation as a member in the Open Government Partnership (OGP)[1]. OPDC by the sub-committee of Public Sector Development Commission for developing and promoting participatory government administration is currently carrying out the abovementioned subject.

The concept of Open Governmentaims to enhance culture-based management on the state's policy and operation that emphasizes innovation and sustainability and

[1] The International Cooperation Organization aims to promote Open Governmentat both national and sub-national levels. Established in 2011, it currently has 78 member countries.

the principle of open data. Government agencies can disclose government data to the public to create transparency, accountability, and ecosystems contributing to public participation (OECD, 2016). People are the center in creating shared value, formulating public policies and services for the government sector, responding to the public's needs efficiently, and building public trust (Janowski, 2015).

However, the concept of Open Government is a new idea that the cabinet has recently resolved. Government agencies at different levels, including the central government, regional governments, and local governments, have not been aware of this issue. There are very few research studies on this issue in Thailand. Simultaneously, some of this concept is part of the country management, supported by laws and regulations. The result has not been well achieved as it should be. Disclosure is often disclosed as requested or as limited disclosure. In addition, Thailand's main challenge is the lack of effective coordination among government agencies and other sectors and the resolution of conflicts arising in collaboration with policymakers and stakeholders. There is no platform to express honest opinions and utilize them seriously. Disclosure is characterized as one-way communication. It lacks the use of comments or complaints from different sectors to improve operation. In general, the complaint system is portrayed as a ritual. Inequality in Thai society leads to a hierarchical control mechanism of the government sector and a unicentric system.

Therefore, the overaching research question is how does the process of open data, transparency, accountability, and governance network shape the emergence and strategy of Open Government initiative? This paper aims to explore the state of Open Government data initiatives, as well as existing tools and approaches. To achieve the aim and answer research quetion, data analytics related to publishing and consuming open data through government portals, and data catalogues were conducted with four main areas: Transparency, Open Data, Accountability, and Governance Network in public health, economy, transport, and agriculture. Data analysis was condected from 27 databases 14 agencies. Additionally, there very few studies of benchmarking Open Government and this

research was designed to address this shortfall obtaining indicators and the resukting measures of government openness.

Benchmark results will offer the Thai government some practical policy recommendations toward weak features and technological dimension that contribute to the government operation based on the Open Government concept to improve public service quality and public well-being and help government agencies become more adaptable and agile to meet people's needs better.

Research Objectives

1) To study and analyze the current status of Open Governmentin improving the quality of public services, and analyze the relationship and data opennss that affect the four dimensions of an Open Government: Transparency, Open Data, Accountability, and Governance Network in public health, economy, transport, and agriculture.

2) To analyze and propose Thailand's Open Government policy and the transaction data from the public manual database’s transaction processing and the frequency of data browsing to analyze the gap for Improvement for each dimension in order to improve the quality of operation and public services to support the changes in the future.

Research design

Research design or framework is an initial and holistic stage that helps researchers to achieve objectives and avoid the situation in which the evidence cannot answer the research questions (Yin, 2009; Bryman, 2016). This research focuses on studying and analyzing Open Governmentthrough the elements of open data against transparency, accountability, and governance network. The research explores which level of Thailand’s current open data status has been achieved and how transparent, accountable, and participatory the open data's creation and mechanism are. Then policy-based recommendations are developed by performing documentary analysis and data analytics and Open Government’s level analysis from 14 government agencies, 27 databases,

consisting of transport and logistics databases (4 databases), public health (4 databases), agriculture (4 databases), and economic, financial, and industrial (15 databases) and from the High-Value Dataset and the highest data browsing statistics, classified by category from www.data.go.th website to analyze the correlation and data linkages that affect the Open Governmentbeing in four indicators: Transparency (from Corruption Index database: CPI and Integrity and Transparency Assessment: ITA), Open Data (from Open Government Data of Thailand database), Accountability (from Good Governance Index database), and Governance Network (from the Good Governance Index database) of each category, to determine which aspects are the outstanding and current status of Open Government. Then analyze the correlation of four-dimensional factors associated with Open Government together with the transaction data generated from the citizen manual database and frequency of data browsing, to analyze the gap for improvement for each dimension associated with each category of data, to develop suggestions, to improve and prepare the policy proposal, to promote the Open Governmentin each dimension based on the correlation and data linkages using dimension index's processing technique and determining the weight of each dimension by analyzing and processing big data (R programming) and displaying a dashboard with Tableau Tool.

Research Method

This research, designed to be quantitative research with statistical data analysis (Data Analytics), is based on the analysis of four areas, including transportation and logistics, public health, agriculture, and economic, financial, and industrial areas. It analyzes the factors' linkages related to the Open Government's development in four dimensions: Transparency, Open Data, Accountability, and Governance Network. The analysis is divided into four steps: Step one Basic analysis, through the availability of High-Value Data and highest data browsing statistics by performing correlation analysis of the data from 27 databases 14 agencies Step Two The analysis of factors related to Open Government's development by performing statistical factor analysis and determining factors related to development (related factors x weight of each area). It consists of four-dimensional factors: Transparency, Open Data, Accountability, and Governance Network. They are linked to high-value data analysis in four areas (transport and logistics, public health, agriculture, and

economic, financial, and industrial). Step Three Diagnostic model data analysis with consideration of four factors relating to Open Government's development, perform data linkage analysis obtained from High-Value data and determining the weight of individual factors in comparison with the diagnostic results and the relevant transaction data relating to the High-Value data categories and highest data browsing statistics to compare the status results of the Open Government's development. Step Four Recommendation-based analysis, analyze the distinctive points of the Open Government's development in all four-dimensional factors, to determine and to make policy recommendations to promote an Open Government based on each dimension according to the correlation and data linkages results, using dimension index's processing technique and determining the weight of each dimension by analyzing and processing big data (R programming) (Forkan et al., 2015) and displaying a dashboard with Tableau Tool (Veljković et al, 2014).

Literature review

The research presents a framework used in research, including Open Government, governance networks, transparency, data openness, and accountability (see Figure 1).

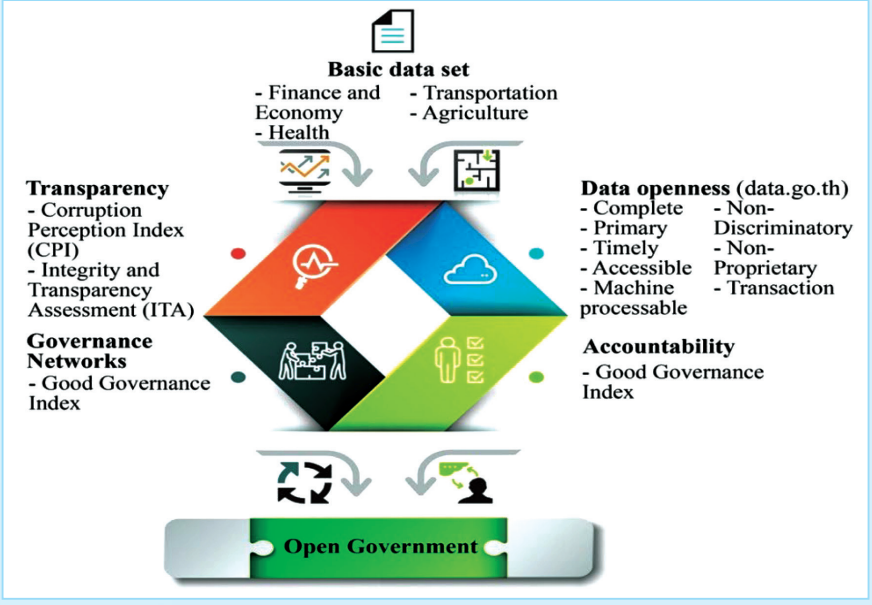

Figure 1. Conceptual framework of Open Government

Open Government

Over the past decade, governments worldwide have increasingly focused on the Open Government's concept because Open Governmenthas brought many benefits to many different dimensions, including increasing efficiency, reducing corruption, and increasing the government agencies' accountability. However, the definition of Open Governmentis differentiated by each country's political, social, and cultural context, reflecting each country's priorities (Mutuku & Colaco, 2012; OECD, 2014). An OECD survey in 2016 found that 51 percent of member states have defined definitions of Open GovernmentAdministration or adapted it from abroad, while the other 30 percent have defined their definitions. The OECD has defined Open GovernmentAdministration as creating a governance culture based on public policy innovations and practices based on transparency, accountability, and participation, leading to promoting democracy and equal growth. The OECD also suggested that the successful Open Government Administration must begin with the definition recognized by all sectors, including all stakeholders. In addition, Geiger and von Lucke (2012) suggest that Open Government consisted of transparency, participation of the private sector, people, government sector, and information technology adoption as part of the public administration. Meijer et al. (2012) proposed that it allowed the people to participate in public administration audits by accessing the public sector’s information and decision-making processes. Open Government is a practical approach integrating external knowledge with the political and bureaucratic processes through information technology deployment. Evans and Campos (2013) also featured technological contexts that helped encourage participation between policymakers and the public.

Open Government consists of open data to ensure transparency and participation, enhancing public value by utilizing social media and technology (Lee & Kwak, 2012). Reddick and Ganapati (2011) studied public satisfaction and government administration success by interviewing 80 Chief Information Officers (CIO). It was found that 76 percent of senior information technology executives believed that Open Government enhanced effectiveness, transparency, and fulfilling the mission of the organization with regards to

transparency, accountability, and technological infrastructure that enabled transparent operation (Relly & Sabharwal, 2009), leading to enhancing trust in the public sector (Nam, 2012; Grimmelikhuijsen & Meijer, 2014)

Piotrowski et al. (2009) provided a view of enhancing Open Government culture by studying key issues related to data regulations implementation. The case study found that factors affecting Open GovernmentAdministration, including transparency, were evaluated by the public sector's information dissemination, public governance, and accountability assessment mechanism. Janssen et al. (2012) identified the benefits of Open Government to politics and society, such as transparency and democratic accountability, through greater engagement and confidence in the public sector. The economic benefits were to create value for the economy and increase data availability for investors and companies.

In summary, Open Government is a reform of government management. It consists of 4 key principles: (1) transparency, (2) accountability, (3) participation, and (4) open data with focuses on developing public service systems and promoting bureaucracy by adopting digital technology. Digital allows more systematic (system approaches) to be implemented in government operation. It is crucial to strengthen networks and decentralization by taking substantial advantage of new technologies such as data sharing and implementing consistent and comprehensive technologies with broader policies. This leads to decisions driven by a network of partners among government, private and public sectors to address today's challenges, help reinforce innovations, promote the ecosystem for public services delivery, and improve government administration efficiency. The transition of culture, bureaucracy, and politics is at the heart of the transitional drive into Open Government.

Open Data

Open data about public sector operation includes storing and disseminating information about government budget spending and performance. It provides both insights and receptive information. The disseminated information must be accessible, easy to understand, and convenient to the users and allow civil society to access the government

data and facilitate the collaboration in maintaining data storage among government agencies. The public's opinion is used to give the public a sense that their views have the highest value and benefits (Harrison & Sayogo, 2014).

The OECD's recommendation on the digital government strategy sets out to promote data-driven culture among the government agencies. Data is valued as an asset. Key features of digital organizations and business models, such as the ability to collect the data, production output, and big data processing to understand the data insight and to identify the future trends by utilizing data and other sources in government administration to understand the needs of service recipients, have continuously improved the performance and expanded the network of external stakeholders to create the shared value-added together.

The focus on information is a key component of the transition to digital government and Open Government, strengthening policy and providing effective government services. Leading countries that tend to focus more on information policy, such as France, Korea, Japan, Mexico, the United Kingdom, and the United States, usually appoint a chief data officer or chief data scientist to assist in government administration and synthesize the highest value from the existing data. These countries often invest in government data development, increase the ability to analyze data, analyze the impact of the current data, improve data management, identify and fill out the government's requirements; for example, Denmark has established an agency responsible for developing data policy.

A typical implementation to opening government data is to collect relevant datasets and their respective metadata and publish them on a Open Government data portal. Another difference between Open Government implementations is the scope, where a portal or catalogue may publish data relevant to a specific administrative region, for example, a city or a country. A large number of countries have created local or national government data por- tals in order to provide access to Open Government datasets (Martin, Foulonneau & Turki, 2013). Four major sites to date are in the US (data. gov),

the UK (data.gov.uk), France (data.gouv.fr), and Singapore (data. gov.sg) (Hendler et al., 2012). Such portals act as one-stop-shops and facilitate consumers' access to government data, saving the trouble of collecting data from various authorities, offices, or websites. Thailand has also established data.goth which was applied in this reseach for evaluating the degree of openness of published data. It is consisted of eight criterias, namely complete, primary, timely, accessible, machiene processable, non-criminatory, non-proritary, and transaction.

Data has become the most valuable resource of the digital economy and is the essential basis for digital government (Bertot et al., 2014). Thailand has not yet developed a regulatory framework for government data or has a specific government data policy to seek capabilities in building the government database proactively.

Digital Government Development Agency (Public Organization) (DGA) has defined that open data can be used independently. It is reusable and distributed by anyone, but the source or owner must be identified, and it must apply the same contract or conditions set by the source or the owner. The disclosure must be as follows;

- Availability and Access - All data must be available, and the cost must not be greater than the cost of duplication, especially for downloading from the Internet. Data must be available in a convenient format and can be updated.
- Re-use and Redistribution - Data must be provided under conditions that allow re-use and redistribution, and integration with other datasets.
- Universal Participation - Everyone must be able to use, re-use, and redistribute the data. There is no discrimination against individuals or groups of people; for example, 'non-commercial' restrictions that prevent commercial use or usage restrictions for certain specific purposes (for example, in education only). Otherwise, such data will not be considered open data.

The benefits of disclosing information to the government sector are to know the needs of the public and to have the ability to provide services to meet the needs of the public successfully, to increase the administration effectiveness and efficiency, to know the problems and solving them before they are escalated, to reduce conflicts/oppositions from the public, to gain cooperation, support, and trust from the public, and to develop a transparent government administration system under the principles of good governance.

The benefits to the public sector are to understand methods, constraints, needs, benefits, and rationales of the government sector, to be able to monitor the local administration, to trust the decisions of the regional and local executives, to cooperate in activities, regulations, and policies set by the government, such as policies and rules in public administration of various projects that have broad impact and to help strengthen and develop the role of the public sector in a creative way, helping to lay down the basis of a Participative Democratic Society.

However, Thailand does not have a specific policy or explicit open data policy for the public sector (OECD, 2019), as well as other countries in the ASEAN, Jordan, Lebanon, and Tunisia (OECD, 2018). The lack of a policy support framework hinders the development of Open Governmentand ecosystem. Open data is a mechanism to promote transparency, network-based government administration, participation, and service improvement.

Governance Network (GN)

GN can be defined in various ways (Tengratanaprasert, 2017). Marsh and Rhode's (1992) define GN as "a limited number of participants, frequent interaction, continuity, value consensus, resource dependence, positive-sum power games, and regulation of members" (p. 23) is widely accepted. Koppenjan and Klijn (2004, pp. 69–70) defined the formation and interaction of GN in a similar way: "more or less stable patterns of social relations between mutually dependent actors, which form around policy program and/or cluster of means and which are formed, maintained and changed through a series of games". Private, semi-public and public actors are involved in GN and are likely to be

dependent on each other's resources and capacities. However, independent operation is essential (Rhodes, 1985; Marin and Mayntz, 1991). GN is perceived as en effective way in interaction among the civil society, , local, regional and national government (Newman, 2001).

Since the 1980s, government institutions have started working with various organisations. The authoritarian structure has shifted to social relations through quasi- and non-government entities. Citizens are likely to be empowered and engaged in the policy making process and how business activity is conducted. Engagement is likely to grow due to social networking (Daly, 2003). GNs can be distinguished from alternative hierarchical and market models in three main ways. First, the relationships between participants in partnerships are autonomous; they actively interact to achieve public preference rather than being authorised by a central authority such as those involved in competitive regulation seen in a business models (Stoker, 1995; Hodge and Greve, 2005; Osborne, 2010). Second, decision-making is collaborative effort and involves a negotiated process that allows a plurality of stakeholders to create joint decisions and mutual solutions. However, the negative impact is that divergence of interests may result in conflicts (Mayntz 1993; McLaverty, 2002; Edelenbos & Klijn, 2005). Finally, stakeholders are likely to acquiesce with negotiated decisions based on a desire to build trust and on political obligation, which can subsequently maintain networks by creating self-regulation and norms (Bovaird, 2005; Bouckaert & van der Walle, 2003). GN involve linkages and overlap between the political and economic arenas and to recognise different forms and outcomes of networks (Agranoff and McGuire, 2003; Torfing, 2007). The crucial challenge, according to Stoker (1995), is to connect local and non-local sources of policy change and to place any analysis within the context of wider processes of change.

Transparency

Transparency is one of the most crucial ingredients of OG. Key indicators of government effectiveness are transparency, governance, and legitimacy. Transparency can be described as transparency of government operations, procedures and tasks and data

transparency. Data openness is still very much viewed as an important new tool that can be used to strengthen transparency of government. It also allows the public to access the internal government flows and investigate whether their representatives have met their expectations is an important step for achieving accountable government (Jaeger & Bertot, 2010). There are long-term considerations of data transparency that pertains to information usability by all. This concern further requires establishing tasks that are related to achieving information usability and accessibility, promoting government and information and technology literacy, making appropriate and accurate content and services available, meeting user expectations, promoting trust, and encouraging lifelong usage (Jaeger & Bertot, 2010).

Benchmarking Open Government

Benchmarking is used as a tool for making comparisons between two or more entities based on a defined set of indicators (Rorissa, Demissi, & Pardo, 2011). E-government benchmarks developed prior to the Open Governmentare not applicable for this model because Open Governmentis more focused on data than on developing electronic services. Furthermore, there has limited acadecmic reserch in this area as a result of the ambiguity of Open Government (Sandoval, 2011). Ren and Glissmann (2012) propose an approach for open data assessment that is based on theory and practice in business architecture and information quality. Six criterias were examined, namely accessibility and availability, understandability, completeness, timeliness, error free and security. Transparency has often been viewed through the lens of government corruption. The Corruption perceptions index (CPI) from Transparency International (TI) measures the perceived levels of public sector corruption. It is based on expert assessments and survey data, covering issues such as access to information, bribery of public officials, kickbacks in public procurement, and the enforcement of anti-corruption laws (Lambsdorff, 2008). Socrata (2011) has performed an Open Government data benchmark study that addresses the open data as a strategic aspect in an Open Governmentmodel. They have studied the presence of open data in government portals, the availability of open data

portals and high-value datasets that are present on the portals. This study clearly addresses one aspect of the Open Governmentmodel, which is open data, but it is necessary that an Open Government benchmark also addresses other Open Government features, namely, transparency, collaboration and participation, and defines appropriate criteria and scales for measurement.

In the proposed benchmark model, open data are used as a data source for two indicators: a basic dataset and data openness (Socrata, 2011). Within the governance network indicator, user involvement addresses citizens' involvement in the government process and decision making. In the scope of the collaboration indicator, user involvement encompasses citizens', businesses' and government agencies' involvement in the process of collaborative decision making. Each of the four indicators (openness, transparency, accountability and governance network) has a set of rules that are applied to scoring open government.

Key fingding and discussion

This section presents findings regarding the current status of Open Governmentin improving the quality of public services, and analyze the relationship and data opennss that affect the four dimensions of an Open Government: Transparency, Open Data, Accountability, and Governance Network in public health, economy, Transport, and Agriculture. The research frameworks from Veljković, Bogdanović-Dinić, and Stoimenov (2014) were employed to validate and assesss the current status of open government.

Step 1: Current state analysis of the four-dimensional factors that result in the development of the Open Government, based on the correlation analysis of the four aspects of data from 14 agencies 27 databases such as transport and logistics, public health, agriculture, and economic, financial and industrial areas, from different development levels to Open Government (OG) according to Table 1.

Table 1 Levels of Development to the Open Government

Percentage Values	Levels
0 - 5%	0 - Cradle
6 - 35%	1 - Basic
36 - 75%	2 - Average
76 - 90%	3 - Above Average
> 90%	4 - High

Source: Veljković, Bogdanović-Dinić, and Stoimenov (2014)

The levels of OG development in each dimension are as follows (as shown in Figure 2);

1) Transparency it is found that public health and economic, financial and industrial data, transportation and logistics data, and agricultural data are at level 3 - Transparency (84.97%, 86.29%, 81.51%, and 81.883%, respectively).

2) Open Data it is found that agricultural data is at the level of 3—Openness (76.83%). Economic, financial, and industrial data and transportation and logistics data are at level 2—average openness (68.533% and 63.93% respectively) and public health data are at level 1— Basic Openness (11.44 percent)

3) Accountability it is found that economic, financial, and industrial data (84.62%), public health data (83.21%), agricultural data (81.55%), and transportation and logistics data (80.18%) are at level 3 — Accountable.

4) Governance Network It is found that economic, financial, and industrial data (84.62%), public health data (83.21%), agricultural data (81.55%), and transportation and logistics data (79.72%) are at the level 3 -Governance Network

Figure 2 summarizes the level of OGP development in each dimension linked to all four aspects of data.

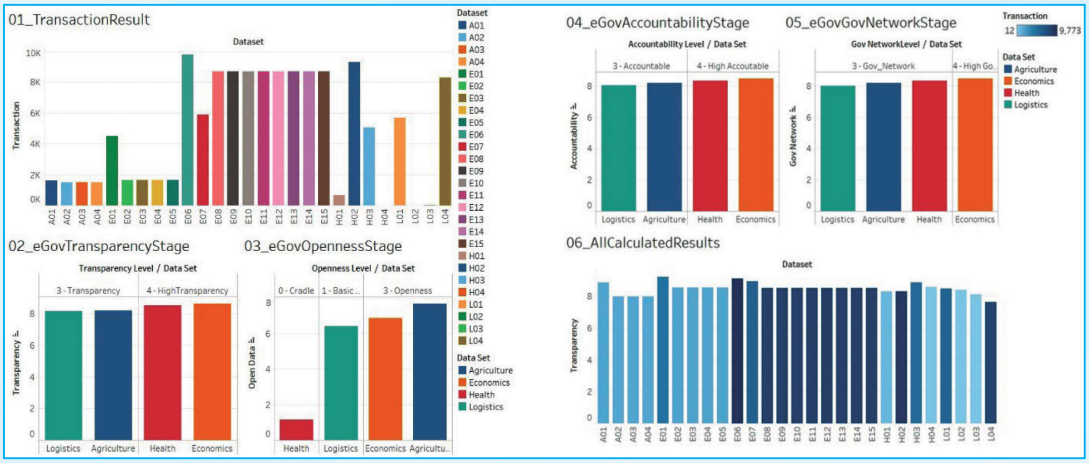

Figure 2: The results of the current state analysis of the four-dimensional factors that affect Open Government's development

Step 2: Analysis of factors related to Open Government's development by performing the statistical factor analysis, determining factors related to development which consists of four-dimensional factors: Transparency, Open Data, Accountability and Governance Network, linked with the analysis of the High-Value Data in four areas (Logistics, Health, Agriculture, Economics) and determining the weight associated with the factor in each dimension, can be calculated as follows:

$$DS = ((0.25 * F1) + (0.25*F2) + (0.25*F3) + (0.25*F4))$$

DS = Dataset Indicator

F1 = Transparency - 25%

F2 = Open Data - 25%

F3 = Accountability - 25%

F4 = Governance Network - 25%

The study found that the average percentage of dataset indicators are as follows; Transparency -76.33%, Open Data - 65.71%. Accountability - 80.44% and Governance network - 81.02% ,as shown in figure 3. It may be said that the government sector should urgently give priority to the development of open data as it leads to Open Government which is in line with the study results.

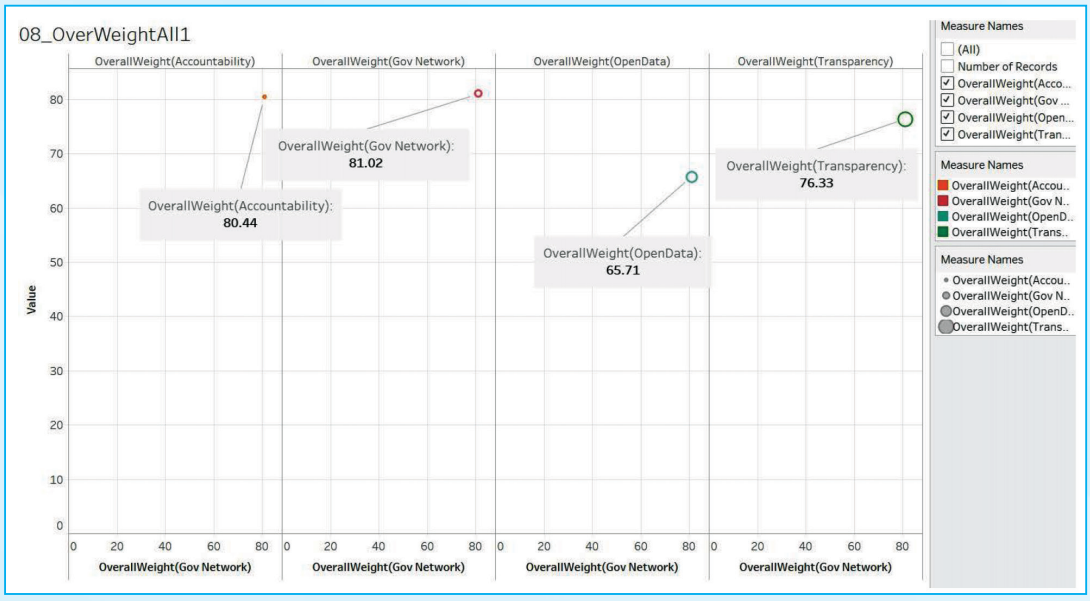

Figure 3: Average of Dataset Indicators related to Open Government

Step 3: Diagnostic model data analysis with four factors related to Open Governmentdevelopment is based on data linkage analysis obtained from High-Value data analysis by determining each dimensional factor's weight compared to the diagnostic results and the transaction data relating High-Value Data category and data browsing statistics to evaluate the impact of open data against the economy and to perform due diligence of the development into Open Government in each dimension as shown in Figure 4, 5, 6, and 7, as follows;

1) Transportation and Logistics it is found that the average transaction concerning the High-Value-Data category is 23.06%, and the average of data browsing is 17.28%, which is considered economically negligible. However, the government operations in transportation and logistics are highly transparent, and it is ready to develop into Open Government if there is the development of Open data per following details;

- Transparency is 81.51%, and the difference in development into the Open Government is 61.33%
- Open Data is 63.93 percent, and the difference in development into Open Government is 43.75 percent.
- Accountability is 80.18%, and the difference in development into Open Government is 60.01%
- Government Network is 79.72%, and the difference in development into Open Government is 59.55%.

2) In public health, it is found that the average transaction related to the High-Value-Data category is 24.70 percent, and the average of data browsing is 18.46 percent, which is considered to be economically negligible. The most effective aspect is Transparency, and It is ready to develop into Open Government if there is a development of open data per the following details;

- Transparency is 84.98%, and the difference in development into the Open Government is 63.39%.
- Open Data is 11.44%, and the difference in development into Open Government is 10.14%
- Accountability is 83.21%, and the difference in development into Open Government is 61.64%
- Government Network is 83.21%, and the difference in development into Open Government is 61.64%.

3) Agriculture it is found that the average transaction related to the High-Value-Data category is 9.99%, and the average of data browsing is 42.73%, which is considered

to have a moderate economic impact. The most effective aspect is Transparency, and it is ready to develop into Open Government if there is a development of open data per following details;

- Transparency is 81.83%, and the difference in development into the Open Government is 55.47%
- Open Data is 76.83%, and the difference in development into Open Government is 50.47%.
- Accountability is 81.55%, and the difference in development into the Open Government is 55.19%
- Government Network is 81.55 percent, and the difference in development into Open Government is 55.19%

4) Economic, financial, and industrial, it is found that the average transaction related to the High-Value-Data category is 42.25 percent, and the average of data browsing is 21.52 percent, which is considered to have a moderate economic impact. The most effective dimension is Transparency, which is higher than the others mentioned above, and it is ready to develop into Open Government if there is the development of open data per the following details;

- Transparency is 86.30%, and the difference in development into the Open Government is 54.41%.
- Open Data is 68.52%, and the difference in development into Open Government is 36.64%.
- Accountability is 81.55%, and the difference in development into the Open Government is 55.19%.
- Governance Network is 84.61%, and the difference in development into Open Government by 52.73%

Figure 4: Development into the Open Government in terms of Transparency

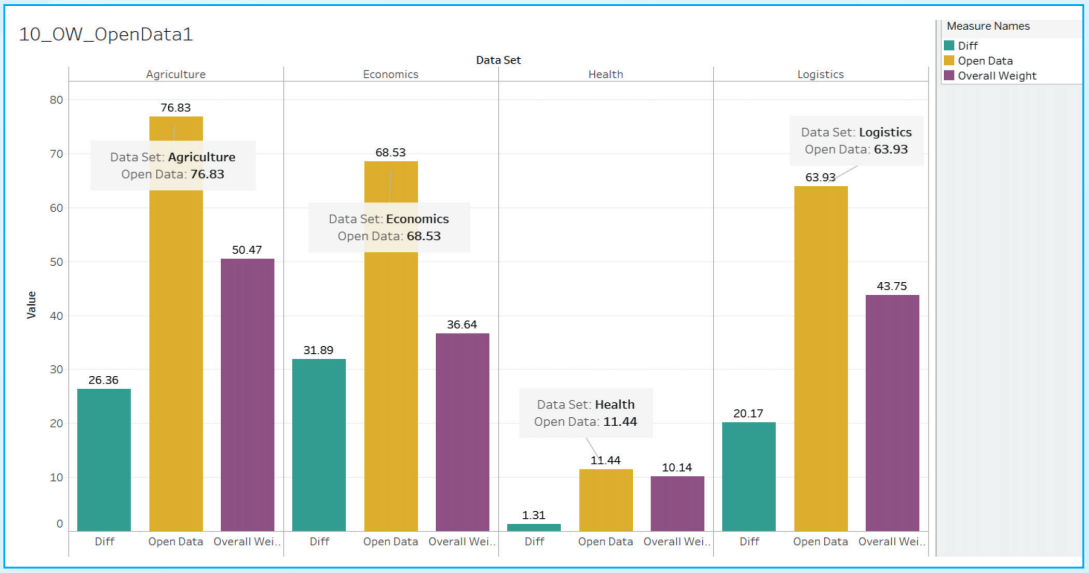

Figure 5: Development into Open Governmentin terms of Open Data

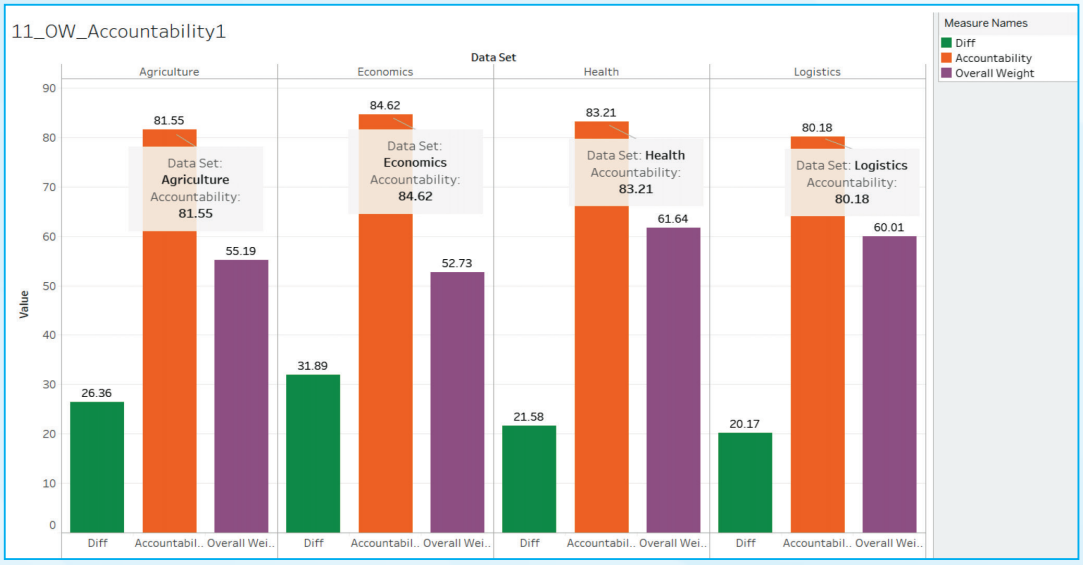

Figure 6: Development into the Open Government in terms of Accountability

Figure 7: Development into the Open Government in terms of Governance Network

Step Four: Advisory analysis to analyze the strengths of Open Government development of all four-dimensional factors, it is found that the average percentage of development into Open Government in terms of Transparency is 8.44%, Open Data is 17.50%, Accountability is 13.14%, and Governance Network is 13.60% as shown in Figure 8.

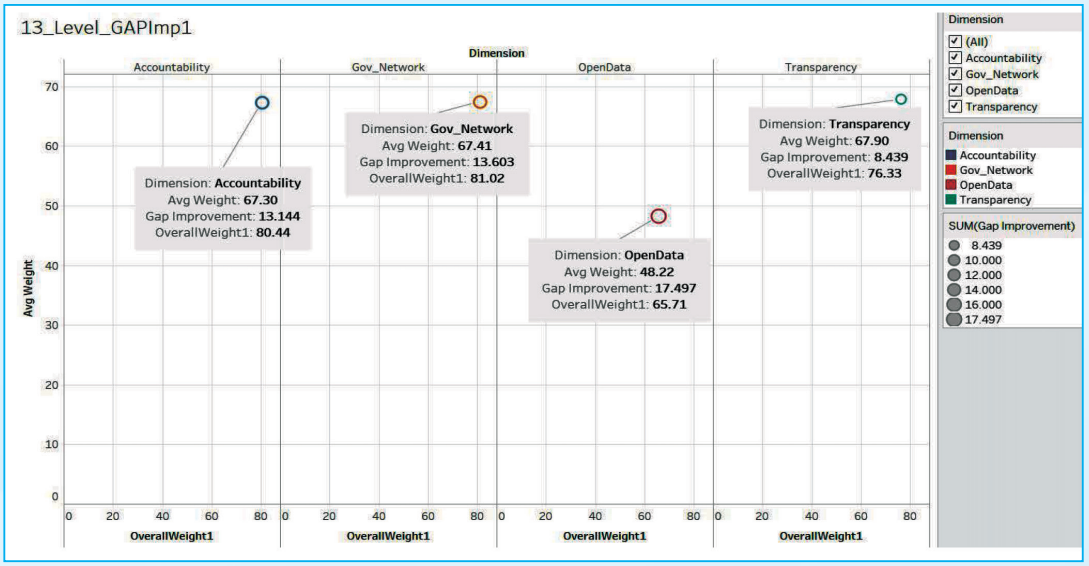

Figure 8: Development into the Open Governmentin each dimension

Formulating and preparing the policy-based recommendations for promoting Open Government in each dimension based on the correlation and the data linkages, the government sector should prioritize the policy promoting and pushing the agencies to take open data as their first priority. As a result, the Open Government's development in terms of Open Data will be increased to 83.21 percent. The second is the Governance Network - by formulating the policy that promotes all network members' participation and integration among the government sector, private sector, civil society, and the people. As a result, Open Government's development in terms of Governance Network will be increased to 94.62 percent. The third is Accountability - by formulating the policy to adjust rules and regulations according to the Open Government's development and identifying

the primary host and the relevant agencies to operate to achieve the agencies' important missions and tasks. As a result, the Open Government's development in terms of Accountability will be increased to 93.58 percent. The fourth is Transparency - by formulating the policy to promote the agency's morality, ethics, and transparency. As a result, Open Government's development in terms of Transparency will be increased to 84.77 percent. Overall, the gap improvement will be 52.68 percent.

Discussion

Based on the data linkage analysis of all four areas, including transportation and logistics, public health, agriculture and economic, financial, and industrial aspects and data linkage analysis of four-dimensional factors related to the development of the Open Government, namely Transparency, Open Data, Accountability, and Governance Network, reflect the prominent opportunity for government agencies to focus on policy formulation in accordance with the development of Open Government. According to Figure 5, it is also found the government should prioritize the promotion of Open Data, particularly the health sector which is likely to be the lowet level. The most obstables of Open Data are personal data concern and cyber security, as a results the government faces some difficuites in diculsure data. To solve this problem, enterprise architecture is required to re-design business model of government agencies according to the good governance principle which can enhance transparency, and collaboration to strengthen democracy (Arcelus, 2012; Chan, 2013; Mutuku & Colaco, 2012). Additionally, data governance is needed to strethen open and connected government. Through the long term interaction with an Open Governmentdata platform, open data promotes not just transparency and accountability, but also democracy (Mutuku & Colaco, 2012). The government must realize the importance of digital technology adoption for public administration in accordance with the Digital Government Development Committee's notification on Data Governance for Government as of March 12, 2020. The Government's task is to establish the rights, duties, and responsibilities of stakeholders in data management and formulate the data policy used in the governance process to systematically control and monitor data operation, resulting

in data security and data quality, socio-economic value, and break-even in operation. In terms of Governance Network, the government promotes the participation which is consistent with the implementation of the country's reform plan, jointly implemented by many agencies, causing significant changes to the public, resulting in happy and good quality of life, in order and harmonious environment, participating in the development of the country and meeting the needs and expectations of the people. In terms of Accountability, the policy is set to adjust rules and regulations following the Open Government's development. It determines the primary hosts and the relevant agencies to achieve the mission and important tasks appropriately following the drive of the national strategic goals (2018 - 2022) within a specified time by elevating the country's potential in various dimensions along with expanding the country's opportunities on the global stage based on the concept of Government of the people, for the people and the public interests.

In terms of Transparency, the policy is set to assess government agencies' morality and transparency. It is a "proactive anti-corruption measure" that government agencies across the country will be required to implement, aiming for assessed government agencies to acknowledge the assessment results and the guidelines for development and raise the agencies' morality and transparency in their operation appropriately. It also promotes the development and raises Thailand's Corruption Perceptions Index (CPI), which is in accordance with the OECD's self-assessment framework, in the National Reform Plan for counter-corruption, and to improve the Integrity and Transparency Assessment (ITA) based on Good Governance in government administration, which focuses on performing duties with integrity, transparency, and verifiability, promoting the Open Government.

Conclusion

The research findings can be concluded that to promote the Open Government; the government should realize the importance of implementing digital technology in the public administration process by urgently formulating a policy for the development and management of extensive databases which can help analyze and develop services

that respond to the public's needs and provide the government sector with the big data that can support proactive and preventive government policies effectively under the drive to integrate public databases and government services in a concrete way, as well as monitor and evaluate the data linkages of various agencies periodically. The responsible agencies are to be assigned and integrated into the operations, especially in the public service sector, in order to reduce the work process, the paper documents, and the resource utilization as well as to implement the information technology systems to create transparency in the operation of the government sector (Integrity and Transparency Assessment: ITA), according to the Good Governance principle.

What interesting about this article is that the government sector should consider formulating an accelerating policy to promote an Open Government focused on open data, network integration, accountability, and transparency to ensure the best benefit of the public.

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