

Analysis of the Characteristics of Smart Platforms by Type of Community Participation

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커뮤니티 참여 유형별 스마트 플랫폼 특성 분석

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ABSTRACT

Digital platforms play crucial roles in terms of enabling and sustaining online communities. However, who really benefits from digital platform development, and what are the benefits digital platforms provide for the development of smart communities. This paper explores this question, the goal was to understand the links between digital platforms and smart communities, using the clustering methodology process to have a better understanding of characteristic of each digital platform, Twenty nine digital platforms is clustered and used as a study case. This paper explores how the categorization of digital platform characteristics encourages participation by a smart community, thus improving information and service delivery. On another side, the rise of digital platforms brings new challenges for policy maker to foster a smart community and firms the digital platform also offer benefits to giving effective and efficient service.

KEYWORDS : *Digital platform, Online community, Smart community, Cluster Analysis, Citizen Participation*

요 약

디지털 플랫폼은 온라인 커뮤니티의 운영과 지속가능성에 중요한 역할을 한다. 그러나 디지털 플랫폼 개발의 진정한 혜택은 누구를 위한 것이며 스마트 커뮤니티의 발전을 위해 디지털 플랫폼이 제공하는 혜택은 무엇이 있을까? 본 연구는 이러한 질문에 답하고자 디지털 플랫폼과 스마트

2022년 11월 15일 접수 Received on November 15, 2022 / 2022년 11월 28일 수정 Revised on November 28, 2022 / 2022년 12월 08일 심사완료 Accepted on December 08, 2022

* 이 연구는 국토교통부/국토교통과학기술진흥원 <빅데이터 기반의 AI도시계획기술개발>(과제번호 RS-2022-00143404)의 지원으로 수행되었습니다.

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커뮤니티 간의 연관성을 이해하고 군집분석 프로세스를 사용하여 각 디지털 플랫폼의 스마트커뮤니티 지원에 관한 특성을 분석하는 것을 목표로 하였다. 본 연구에는 29개의 디지털 플랫폼이 연구 사례로 활용되었다. 이를 통해 디지털 플랫폼 특성을 구분하여 각 특성에 따른 플랫폼 서비스가 어떻게 스마트 커뮤니티의 참여를 유도하고 정보 및 서비스 제공을 개선해나가는지를 분석하였다. 디지털 플랫폼의 발전은 정책 입안자에게 스마트커뮤니티 육성을 통한 도시 혁신의 새로운 도전과제를 제공하기도 하고 효과적이고 효율적인 서비스 제공 수단으로서의 역할이 강화되고 있는 것으로 나타났다.

주요어 : 디지털 플랫폼, 온라인커뮤니티, 스마트커뮤니티, 군집분석, 시민참여

Introduction

Digital platforms play crucial roles in terms of enabling and sustaining online communities. A platform is a building block that provides essential technological systems and serves as the foundation on which complementary product technologies or services can be developed (Gawer, 2009). Although product and technology platforms have become important in many industries, the recent pervasive penetration of digital technology has significantly further elevated the importance of platforms especially in terms of IT enabled products and services (Yoo *et al.*, 2010). However, these theories do not address the effectiveness and the problems that arise from digital platform that support online communities.

The roles of digital platforms have been expanded not only to provide communities with data or information but also to support such communities; increasing numbers of heterogenous users require continuous IT updates. Although digital platforms play crucial roles in terms of supporting online communities, we lack a deep understanding of how an organization can effectively build a supportive digital platform. The objective of this paper was to analyze the characteristic of

digital platform based on the categorization this will help to develop the efficient digital platform interaction between the platform provider and platform user. Drawing from prior literature on online communities, and platforms we present important elements of our digital platform categorization, we define and expound the justificatory knowledge, purpose, and scope function of digital platform to effectively supporting the online community. Using multiple case study and in-depth review to make a categorization.

Literature Review and Research Methodology

1. Literature review

Governments believe that technology can replace governments and human responsibility. A digital platform allows effective citizen communication with government (Gil *et al.*, 2019; see also Spagnoletti *et al.*, 2015). As online communities are complex, each community has different needs. This is why digital platforms play crucial roles in enabling and sustaining online communities. They provide essential technologies and serve as a foundation. The roles played by digital platforms become increasingly important when offline communities shift

online. Development of smart communities greatly benefits both governments and citizens, and opens up new possibilities. A digital platform enhances equality among a smart community (Satar et al, 2020). Digital platform are omnipresent phenomenon that changing how we consume and provide digital product and service, whereas traditional firms create value within the boundaries, digital platform utilize and ecosystem of autonomous agents to co-create value (Hein et al, 2020). The constant development of ICT project, will make isolation this isolation causes limited sharing of resources a digital platform can offer a solution to support the community to remove this isolation (Phahlamohlaka et al, 2014). Cluster analysis can identify a spatial range with high connectivity in terms of similarity patterns (Heo et al, 2022). Analyzing the spatial distribution and characteristic and pattern there are possibility we can make a prediction (Heo and Moon, 2012) about the needs of the community.

A previous study found that the shift of an offline community to online using a digital platform usefully connected the public and private sectors. Again, all digital platforms feature unique characteristics.

2. Research methodology

We use cluster analysis as the principal research method. Cluster analysis is also termed segmentation analysis and taxonomic analysis, and is a set of techniques that partition a group of objects into relatively homogeneous subsets based on inter object similarities (Kachigan, 1984). Cluster analysis or clustering is an unsupervised machine

learning task. Natural data groupings are automatically discovered. Unlike supervised learning (example: Predictive modeling), clustering algorithms interpret only the input data to find natural groups or clusters in feature space. The spatial pattern

Many algorithms use similarity or distance measures among samples in the feature space as a means to discover regions dense in observations. Thus, it is often good practice to scale data prior to the use of clustering algorithms. Central to all goals of cluster analysis is the extent of similarity or dissimilarity between individual objects being clustered. A clustering method attempts to group objects based on a supplied definition of similarity (Hastie et al, 2001). Some clustering algorithms require one to specify or guess the number of clusters to be discovered, whereas others require the specification of a certain minimum distance between observations below which examples may be considered “close” or “connected” .

An online community core is social interaction, Therefore, it is crucial to comprehend the dynamics of various forms of social interaction structure while constructing digital platforms. In online communities the transaction cost theory is valuable tool for examining various social interaction and the governance structure that go with them. According to Benkler (2006) and Shirky (2008) the growth of IT led to collapse in transactions costs, which allowed for the establishment of new social interaction structures that may be distinguished by information sharing, collaboration, and collective action. these three various categories of social interaction structures are defined in this study.

TABLE 1. Introduction of 29 digital platform cases

No.	Service name	Description	Source
1.	Better Reykjavik (Iceland)	Better reykjavik is co-creation project of the citizens foundation, Reykjavik city and it's citizen that connects them and improves trust and policy.	https://betrireykjavik.is/domain/1
2.	Fix My Street (United Kingdom)	Fix my street is a map based platform and app by my society that helps people in the United Kingdom inform their local authority of problems needing their attention.	https://www.fixmystreet.com/
3.	Open Street Map (United Kingdom)	Open street map is a collaborative project to create a free editable geographic database of the world. The geo-data underlying the maps is considered the primary output of the project.	https://www.openstreetmap.org/#map=7/35.948/127.736
4.	Small Business Research Initiative (United Kingdom)	SBRI bring together the government challenges and ideas from business to create innovative solution.	https://www.gov.uk/government/collections/sbri-the-small-business-research-initiative
5.	Linea Verde (Spain)	Linea verde is a platform that provides services to improve municipal management, the resolution of incidents on public road and foster communication with citizens and information sharing.	https://www.lineaverdemunicipal.info/que-es-linea-verde/
6.	Madame la Maire, J' ai un idee (France)	Madame la Maire, J' ai un idee is an ideation platform that encourages broad citizen participation. All the inhabitants of Paris are invited to submit their project their ideas and project for their city on various themes.	https://idee.paris.fr/en/
7.	Biliji (South Korea)	biliji is platform service that allows individuals to borrow and lend items that are not used. The company is trustworthy sharing company certified by Seoul metropolitan City Government no 22.	https://www.rocketpunch.com/companies/biliji
8.	New Urban Mechanics (United States of America)	New urban mechanics is connecting the government departments and communities to explore, experiment, and evaluate new approaches to government and civic life.	https://www.boston.gov/departments/new-urban-mechanics
9.	Youth Boston (United State of America)	Youth Boston is a platform that develop and engage the Boston Youth' s and connect them to opportunities and professional growth.	https://www.boston.gov/departments/youth-engagement-and-employment
10.	Sharing City Seoul (South Korea)	Sharing city Seoul is an social innovation measures that have been designed to create new economic opportunities, restore reliable relationship and reduce wasting of resources.	https://use.metropolis.org/case-studies/the-sharing-city-seoul-project
11.	Peta Jakarta (Indonesia)	Peta Jakarta.Id is an information sharing map that help the citizen in Jakarta to know up to date information about disaster happen around them.	https://jakartasatu.jakarta.go.id/portal/apps/sites/#/public
12.	Block pooling (Singapore)	block pooling is the platform that connecting the dense neighborhoods in Singapore, that helps them to provide services to each other.	https://www.blockpooling.sg
13.	Ushahidi (Kenya)	Ushahidi is open source platform which utilize user-generated report ti collate and map data. It uses the concept of crowd source serving as an initial model for what ha been coined as ' activist mapping'	https://www.usahidi.com/
14.	Meal Logger (Finland)	Meal logger is an image-based platform that coaches user in food choices. User take picture of their meals and receive nutrition advice from proprietary neural network and dietitian.	https://www.meallogger.com/
15.	Witrafai : Rent-a-park (Finland)	Witrafai is a parking-space sharing-economy service that takes away the trouble of finding parking in the city by putting available space into productive use.	https://www.rentapark.fi/
16.	Auntie (Finland)	Auntie, a provider of life crisis solutions and virtual psychological support, has produces a chat bot that gives anonymous user feedback with the of an AI and directs them to appropriate self-help service.	https://auntie.io/en/

TABLE 2. Continued

No.	Service name	Description	Source
17.	Hongkong' Voice Map (Hongkong)	Voice map HK, this free application talks out loud to its users, indicating their whereabouts and what' s surrounding them, and element incredibly helpful for people with visual disabilities.	https://hongkongsoundmap.com/en/about
18.	State of Arkansas Gov2Go (United States of America)	Gov2Go provides a platform that help citizens interact with any level of government agencies. User can perform tax payments, voter registration or renew expiring car tag.	https://www.getgov2go.com/
19.	New Zealand' s Snap Send Solve (New Zealand)	Snap send solve, is the platform users can report local issues anything from local parking to potholes in 30seconds or less.	https://www.snapsendsolve.com/
20.	Tuup (Finland)	Tuup was looking into how to impact mobility choices of residents and increase the use of shared vehicles.	https://www.kyyti.com/
21.	Mid and East Antrim Borough Noise (United Kingdom)	This platform is help to solve the problem of loud noise in neighborhood, by recording the noise as they happen and used them as a prove in the .gov.uk/resident/environmental court.	https://www.midandeantrim.gov.uk/resident/environmental-health/noise
22.	Milton Keynes Parking App (United Kingdom)	Milton Keynes is a platform that provide one stop service from bus timetable to council tax and benefits offers a range of digital public service on the go.	https://www.milton-keynes.gov.uk/
23.	The Government of British Columbia Drive BC (Canada)	The apps objective is to assist a drivers with route planning to navigate the province easier and faster. The app is provide with major highway event to unsuspected border delays.	https://www.drivebc.ca/mobile/
24.	AI4govt (United States of America)	A secure and customizable platform that seamlessly connect leggacy government systems together and automates administrative tasks.	https://ai4govt.com/
25.	Beam (United States of America)	Provides unified, end to end cash assitance platform for institutions and government.	https://www.bybeam.co/
26.	City of Miramar Mass notification (United States of America)	The City of Miramar mass notification platform is structured to disseminate emergency notifications such as boil water alerts, weather advisories, and road closures to the whole city or specific geographical area.	https://www.miramarfl.gov/list.aspx
27.	Virginia Smart Community test bed (United States of America)	the goal of the test bed is to be solutions center where new innovations can come to be validated as a last step before entering the market, with Stafford County and Virginia as potential first customers.	https://www.virginiaipc.org/smart-community-testbed
28.	Thrugreen (United States of America)	Thrugreen is a modern traffic lights by connecting them to traffic data, reducing wait times at red lights.	https://thrugreen.com/
29.	Inzone las vegas (United States of America)	INZONE program is designed to catalyze innovative service and create virtuous cycle of investment in an opportunistic location in the Las Vegas market. INZONE Las Vegas will serve as an economic catalyst for bridging the digital divide and accelerating industry 4.0.	https://www.vapor.io/inzone/las-vegas/

We choose the 29 cases (table 1) to uses in this study using purposive sample approach in the present and late digital platform case that have the most impactful effect to the community or innovative

approach to the community. The impactful case can be determine by the sized of the project and the community involved in the digital platform project and for the innovative case can be determine by the

solution finder and service provider

In this paper, we use K-means algorithms; these are the most widely known clustering algorithms. Examples are assigned to different clusters in an effort to minimize the variance within each cluster. The main purpose of a K-means algorithm is to develop a process for partitioning an N-dimensional population into k sets on the basis of the sample. The process seems to yield partitions that are reasonably efficient in the sense of within class variance (McQueen, 1967)

Classification Analysis of the Digital Platform

1. The structure of a digital community platform

Social interaction is at the core of an online community. When designing a digital platform, it is important to understand the type of interaction in play. There are three structures the first structure is information-sharing. in here, the

goal/objective of the actor (subject) is only to share information. There is no intention to collaborate. All actor actions are completely independent. Therefore, no set of rules is needed. An example of such a structure is a social medium such as facebook. Second one is collaboration in a collaborative structure, the actor follows rules set by the organization to achieve an organizational goal. This structure is more complex than that of information-sharing because the actor must follow rules when performing certain actions. The actors still act independently, but within the rules. Open source platforms like wikipedia use this kind of structure. The last one is collective in this type of structure, all actors are fully aware of the goal and the rules set by the organization to achieve the goal. However, the rules become very complex when the community goal is prioritize over personal interest. The difference between collaboration and collective action is that, during collaboration, actors perform different actions independently to achieve the same goal but, in a collective environment,

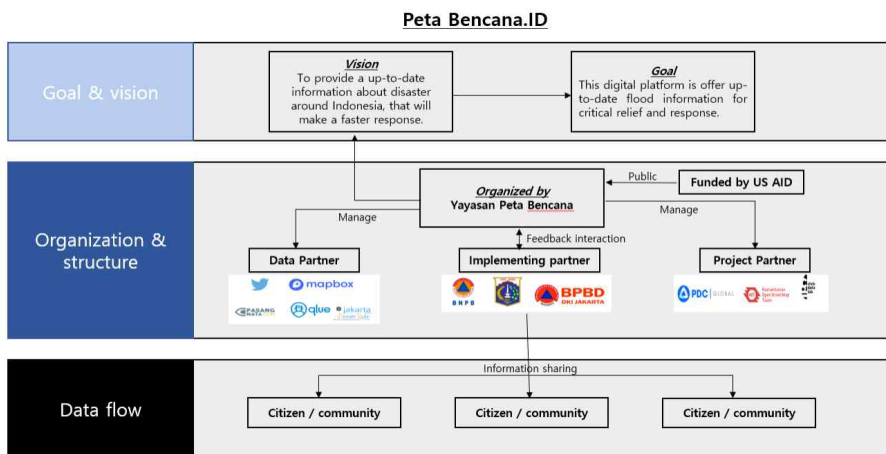


FIGURE 1. An example of information-sharing digital platform

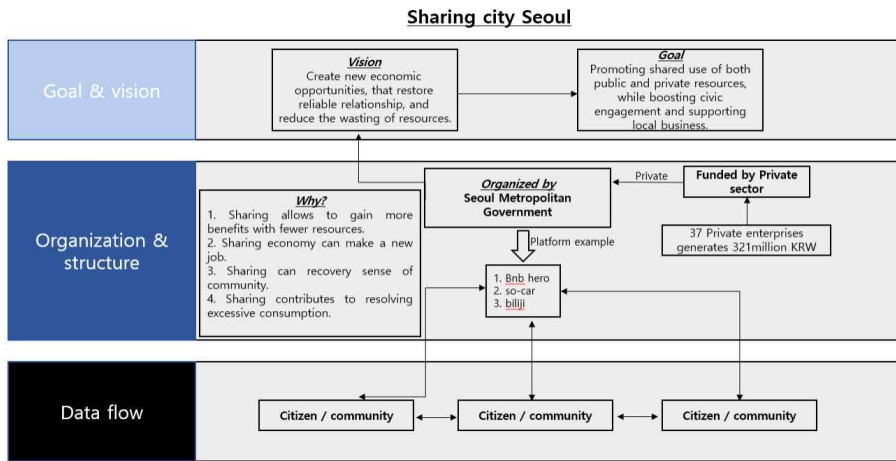


FIGURE 2. An example of collaboration digital platform

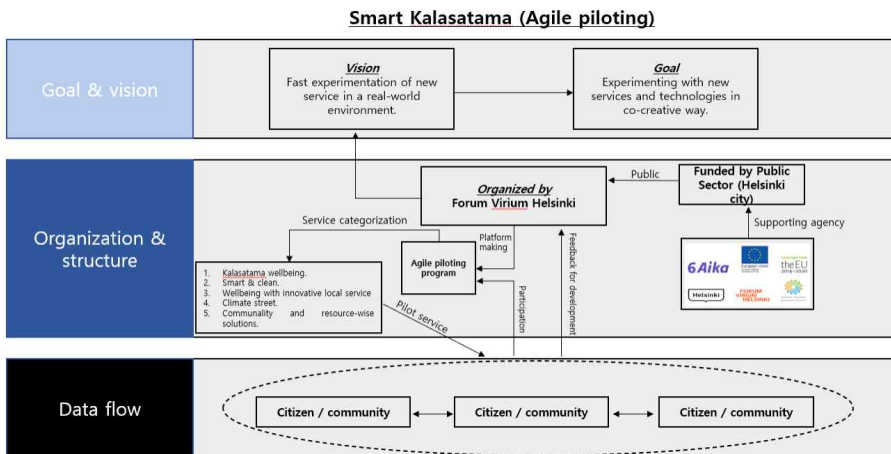


FIGURE 3. An example of collective digital platform

actor actions are controlled by a collective decision on how to achieve the goal. Good examples of each category are shown in figures 1, 2, and 3. All figures show the goals, the organizational structures, and the data flow. They reveal how the digital platforms work.

As seen from the figure 1, figure 2, and figure 3 we can see the difference on how each digital platform categorization interact with the community, this make us easier

on how to determine how each digital platform is working and interact with the community and also from the figure above we can determine the variables to categorize the digital platform.

2. Digital platform clustering analysis

To obtain insight into the characteristics of digital platforms we perform clustering analysis using nine independent variables,

TABLE 3. Digital platform services and multiple independent variables

	V1	V2	V3	V4	V5	V6	V7	V8	V9	Cluster
Better Reykjavik	5	3	1	2	2	2	1	2	2	2
Fix My Street	5	2	1	2	3	3	5	2	2	3
Open Street Map	6	1	1	2	2	1	6	1	1	3
Small Business Research Initiative	4	1	2	2	3	2	1	1	1	2
Linea Verde	7	2	1	2	3	2	1	2	2	2
Madame la Maire, J' ai un idee	4	2	1	3	3	2	1	2	2	2
Biliji	6	1	1	3	2	3	4	2	2	3
New Urban Mechanics	5	2	1	1	3	2	1	2	2	2
Youth Boston	1	2	2	3	3	2	3	2	2	1
Sharing City Seoul	7	1	1	3	2	3	1	2	2	2
Peta Jakarta	2	1	1	1	2	1	5	1	1	1
Block pooling	5	1	1	3	1	1	5	1	1	3
Ushahidi	7	2	1	1	3	2	5	2	2	3
Meal Logger	6	3	1	3	1	3	4	1	1	3
Witafi : Rent-a-park	5	2	2	2	2	2	6	2	2	3
Auntie	7	3	1	2	1	1	4	1	1	3
Hongkong' Voice Map	7	2	2	3	1	1	3	1	1	3
State of Arkansas Gov2Go	5	2	1	3	3	2	3	2	2	2
New Zealand' s Snap Send Solve	5	2	1	3	3	2	3	2	2	2
Tuup	6	1	2	3	2	2	6	2	2	3
Mid and East Antrim Borough Noise	5	2	2	3	1	1	3	2	2	2
Milton Keynes Parking App	1	3	1	3	3	1	6	2	2	1
The Government of British Columbia Drive BC	1	2	1	3	2	1	6	2	2	1
Al4govt	7	2	1	3	3	2	3	1	1	2
Beam	7	1	1	3	3	3	1	2	2	2
City of Miramar Mass notification	7	2	1	3	3	1	5	2	2	3
Virginia Smart Community test bed	4	2	1	3	3	2	4	2	2	2
Thrugreen	7	1	2	3	2	1	6	2	2	3
Inzone las vegas	4	1	2	2	3	3	3	1	1	2

V1 : Organizational structure

V2 : Funding

v3 : Data flow

v4 : Goal/Vision

v5 : Co-ordination

v6 : Strategic principles

v7 : Domain of the service

v8 : Adaptation

v9 : Extensibility

as shown in figure 4.

We begin by clustering 29 digital platforms, using the methodology described above into three categories, each of which features a unique core service. Each digital platform

with a similar core service is unique within the cluster. The core service of each digital platform was defined using nine variables of the organizational structure, the funding arrangement, data flow, and

extensibility. Each variable has traits that differentiate it from other variables. In this chapter, we will discuss how the variables are calculated for each digital platform:

Organizational structure we use the organizational structure of the PPPP concept, thus the “public, private people, partnership” (P4) idea that embraces bottom-up participative strategies that render public engagement clearly visible during infrastructure planning and policy-making. Using this newly developed framework and associated engagement strategies, decision-making power can move from policy-makers, who have traditionally held ultimate authority, toward citizens exhibiting proactive engagement (NG *et al.* 2012). Using this framework as a base, we categorize PPPP into six different categories. (public=1, private=2, people=3, public private=4, public people=5, and private people=6).

Funding In line with (Michael *et al.* 2018), we differentiate funding into three options. The first is public funding and private financing. The public or private sector provides payments that cover all agreed costs (including financing), thus full coverage of expenditure agreed returns. The second option is a model featuring user fees/ charges; users (third parties) pay directly for services (for example, via road tolls). This is more risky than public sector payments because it is difficult to quantify payments in advance, (private=1, public=2, crowd funding=3)

Data flow Open data values are transparent, and their accountabilities are similar to those of most other public goods; both positive and negative values can be created using open data (Zuiderwijk *et al.* 2015). In contrast, closed data value

privacy and information safety, allowing citizens to hide their identities; again, both positive and negative values may be created. This discussion allows us to conclude that the main difference between the two methods is how data holders share their data with the public. (open data flow=1, closed data flow=2)

Goal/Vision according to Spagnoletti *et al.* 2015, we can separate goals into three categories: each actor is free to pursue his/her own goal, although negotiations are not excluded. Goals are negotiated between actors. (personal interest=1, organization interest=2, public interest=3)

Co-ordination According to Spagnoletti *et al.* 2015, digital platform co-ordination can be split into three categories: horizontal and self regulating; horizontal and self regulating with hierarchical and formal aspects; and horizontal but executed via mutual adjustment. Again, hierarchical and formal aspects may be present. These three categories describe how co-ordination on a digital platform depends on the service dimensions. The chosen co-ordination helps an actor to behave appropriately with other actors. (free regulating=1, semi regulating =2, regulating=3)

Strategic principles can be separated into information sharing strategic principle, contents/objects are cached within the network, to ensure efficient data delivery (Ren *et al.* 2014). This strategy is focused on how information is delivered to the citizen. The core idea is that is delivery is efficient. Shared platform this term is commonly used to describe the situation where an organization hosts and provides a legal home for a project or initiative that is unincorporated and does not have

individual legal status (Network Ontario, 2022). Customer-centric, this is both a strategy and a business culture that is focused on creating the best experience for the customer and, thus, on building brand loyalty. A client or customer-centric business ensures that the customer is at the center of the business philosophy, operations, and ideas. Customer-centric businesses believe that their clients are the primary reason why they exist, and they use every means at their disposal to keep clients satisfied (Frankenfield, 2021). (information-centric=1, shared platform=2, customer-centric=3)

Domain of the service a successful smart city strategy hinges on the ability of a city to innovate within six key domains the economy, environment and energy, government and education, living and health, mobility, and safety and security (Deloitte, 2017). Economic digitization and other disruptive technologies have changed the requirements of many jobs. A digital platform will help develop strategies to address jobs of the future that aid the community. An environment and energy digital platform must foster sustainable growth. The platform must encourage wiser use of resources, from implementation of leakage sensors to the use of economics and gamification to encourage citizens to make thoughtful decisions when using resources. A government and education digital platform must use analytics to develop insights into major policies, to track performance and outcomes, enable constituent engagement, and help to improve government efficiencies in all related domains. A truly digital living and health platform uses technology and connectivity

to enhance the daily lives of people. The platform must encourage community connections via health care sector innovations, and must use data to monitor and enhance social programs. Safety and security from crime must become smarter and more hightech; public safety and security agencies must accept this. Digital platforms play important roles in crime prevention; they seek to preempt crime by tapping into many data streams including social and crowd source information. Mobility has become as much about the bit sand the bytes as about physical infrastructure. A digital platform aids integration of mobility systems including shared mobility service that enable people and goods to move faster, safer, cheaper, and cleaner. (economy =1, environment and energy=2, government and education=3, living and health=4, safety and security=5, mobility=6)

Adaptation, as city and user situations change over time, many applications and services can provide better results if they use contextual information. Some platforms gather information from users. Other platforms employ information from the city, including traffic conditions, climate, and air quality (Eduardo *et al.* 2015). (adaptable=1, non-adaptable=2)

The last one is extensibility. The capacity to add services, components, and applications to the platform is important to ensure that the platform meets evolving system requirements and user needs. Extensibility is valuable because we do not know all the services a city may need. It is important that the platform be readily extensible (Felipe *et al.* 2015). (extendable =1, non-extendable=2)

The nine variables used in calculation

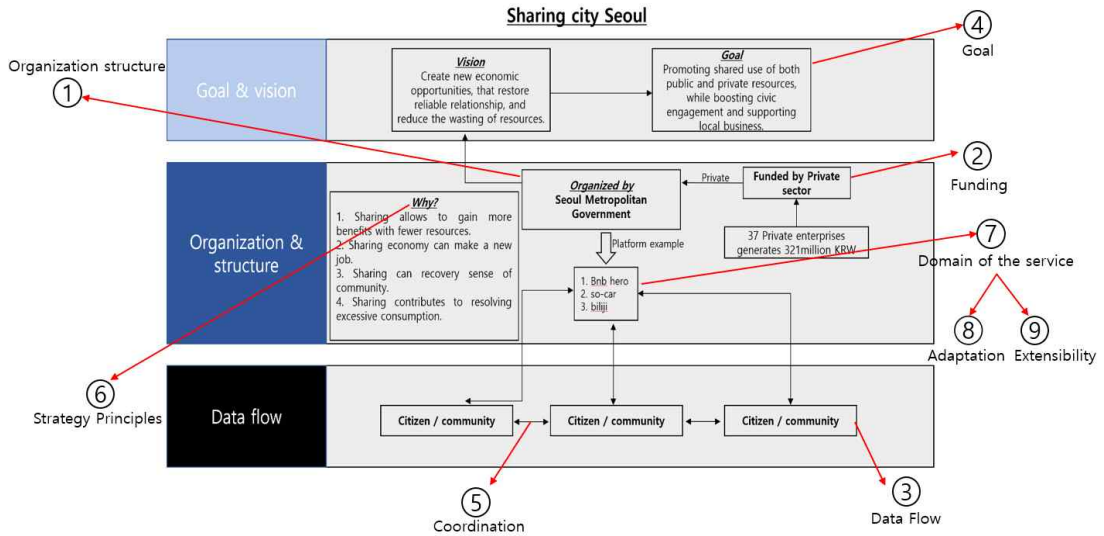


FIGURE 4. Variables distribution explanation

TABLE 4. Digital platform core service based on the cluster

Cluster of digital platform	Core service
Cluster 1: Information-sharing	Provide vital information to citizens.
Cluster 2: Collaboration	Provide the space for collaborative projects.
Cluster 3: Collective	This capabilities of this platform are similar to those of collaboration platform. the difference is the 'rules' bind all members.

have been described above (points 1–9); the next step is to learn how to coordinate the calculations of each digital platform. To render it easier to determine the point distributions of all variables, we gathered data from many sources and compiled the data using a simple model, thus the 'Sharing city Seoul' model. All data used in the model were collected in Seoul (Government Seoul, 2012). After creating the model, we used the guidelines applicable to each variable to distribute the points. For example, we commenced at point 1 (organizational structure); the

digital platform is organized by the Seoul metropolitan government but the funding is from the private sector, and the platform targets citizens. Thus, the organizational structure is PPP (public, private, people). For point number 2, as shown in the model and the data, funding is from the private sector. In December 2018, Seoul City identified 37 private enterprises and organizations that sought to boost their public reliabilities; 321 million won were raised.

Digital platforms support heterogenous user needs from personal to community

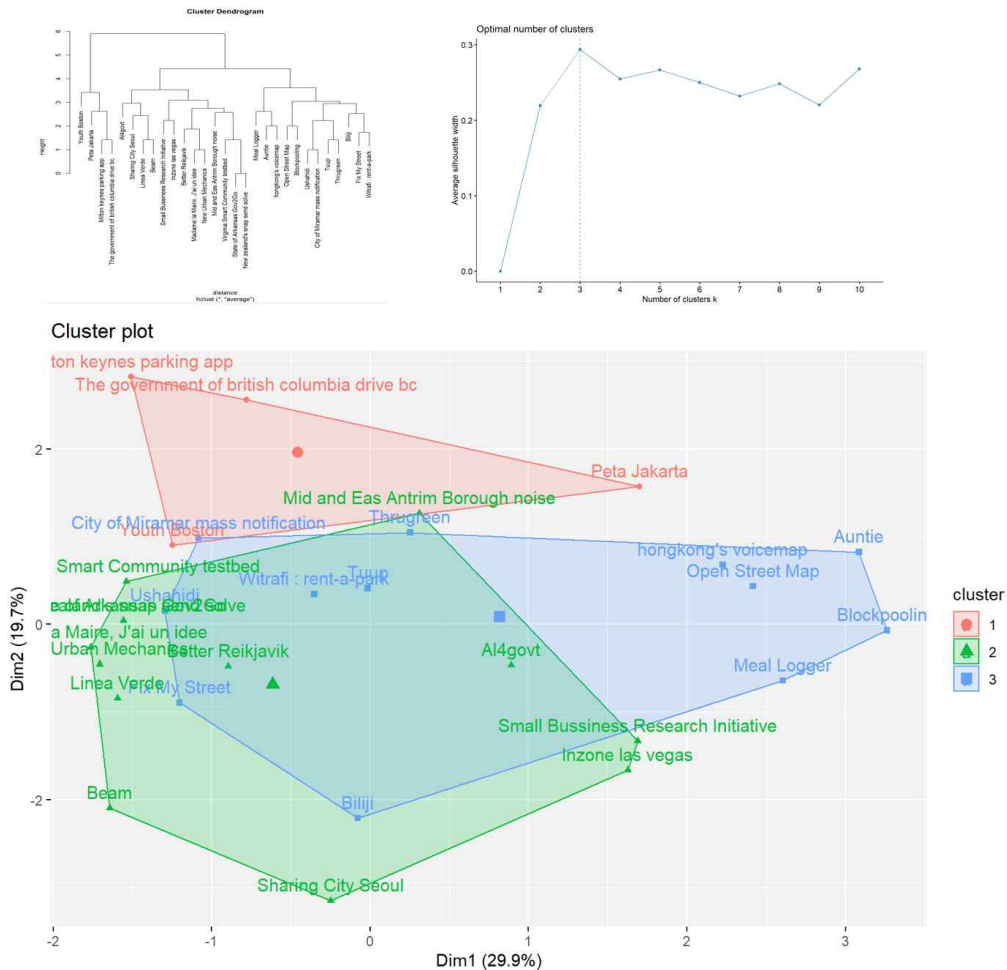


FIGURE 5. Result of 29 digital platform clustering

goals; the digital platforms improve as IT develops. To fulfill the broad needs of each category in the previous Table, any digital platform must meet certain basic requirements. Table 3 serves as a guideline to the interface, core, and complementary services of platforms. Figure 4 is based on table 3; several examples indicate that digital platforms can be categorized in more than one way. In fact, to ensure

effectiveness, cross-platform categorization may be helpful.

as seen on table 4 – 5 and figure 5, we can explaining the core and unique characteristic from each cluster. Information-sharing-Collaboration an information-sharing digital platform is a virtual space that is not geographically limited community members can access the platform anywhere, anyhow, and anytime. As the objective of sharing specific information

TABLE 5. A comparison of digital platform characteristics

Dimension	Information-Sharing	Collaboration	Collective
Level of intimacy	Low-to-medium	Medium	High
Type of Relationship	The connection is uncooperative, impersonal, and identity is unimportant.	The connection has little cooperation, is impersonal, and identity is unimportant.	The connection has cooperation, the actors have power (roles), shared values and beliefs, and the actors identities are essential.
Information requirement	Information is codified, abstract, and diffused.	Information is codified, abstract, and diffused.	Information is not only abstract but also concrete, un-codified, and only relatively diffused.
Co-ordination	Co-ordination is horizontal and self-regulating.	Co-ordination is horizontal and self-regulating even though hierarchical and formal aspect may be present.	Co-ordination is horizontal and achieved via mutual adjustment. Hierarchical and formal aspect are present.
Goal	Personal interest.	Personal interest may be fulfilled when actors so negotiate.	An organizational goal is to be achieved by the collective actions of actors.
Value	The actors can share and search for any information that is required; all actors are independent.	Actors may collaborate horizontally to achieve personal and community goals.	The actions of all actors are dictated by the platform. A goal is to be reached via collective action.

with a certain actor/user may be to set up a new collaborative project, the benefit of combining the two types of digital platforms are obvious. Online collaboration relies on a capacity to manage a shared repository and codified information. Community members must be able to access relevant information easily; this is where an information-sharing digital platform is of assistance. Information-sharing-Collaboration as explained above, a digital platform that is focused on information-sharing may support another platform. The main role of an information-sharing digital platform is to provide a private, safe, and secure environment in which members can exchange information, reach consensus, engage in collective action, and act as a group to achieve a common goal. Collaboration-Collective a collaboration/collective digital platform is a similar type of platform; the difference is that certain rules bind all actors. It is possible to view a collective platform as a development of

collaboration.

Analysis Results

Digital platforms operate in three ways that reflect relationships among the main stakeholders, i.e., government, private concerns, and citizens: Citizens to Government (C2G), citizens communicate with or give feedback to government, and contribute to the platform shaping that citizens require. Government to Business (G2B): Once government has fulfilled its obligation to citizens, researchers turn to government to business (G2B) models. These aid businesses to find business partners, to share information online, and to access legal and administrative support. Government to Government (G2G), a government to government relationship is aimed at fostering co-ordination and co operation among government agencies. This improves the relationship between the government and the private sector. If the

three types of interaction are efficient and effective, digital platforms support the community. We now present a few case studies to show this.

Government to Citizen (G2C), governments seek to provide citizens with information and services in an efficient and cost-effective manner, and to encourage citizens, using various platforms, to support these activities and give feedback that improves service. Providing citizens with government notification and service, this platform shares essential information with citizens, who can personalize the information received.

'Peta Bencana' (Indonesia) is an open source disaster map for all of Indonesia but principally Jakarta. It offers up to date information, allowing relief and response efforts to be targeted and effective. 'Peta Bencana' plays key roles in reducing harmful impacts and maximizing resilience. Keeping the government informed about citizen problems, concerns, and opinions, this platform is used by citizens to give feedback on problems faced in daily life the government can then look to solve the problem efficiently and anticipate future problems. 'Fix My Street' (UK) allows citizens to report problems easily, in two simple steps (an address and the details of the problem). This platform is a one-stop service; the government solves the problems. Assisting citizens to find proposals, individuals, and associations, this platform serves as a bridge allowing citizens to find communities with which to collaborate, and encourages citizens to play active roles in service development. The 'Better Reikjavik' (Iceland) platform provides a space wherein citizens present their ideas on issues regarding city services and operations. Citizens can

argue, rate services, and voice opinions. The best ideas are taken up by appropriate standing committees. However, the city can intervene not all ideas are addressed. Sharing distributed information or collaborating in public policy formulation this C2G platform allows a community to collaborate, to solve a problem a good example is 'Ushahidi' (Kenya). Citizens helped to map reports of violence after the election in 2008 this is an example of bottom-up flow. A recent work by Cantador *et al.* (2017) aimed to ensure more meaningful participation in digital platforms by both governments and citizens. The work explores digital platform capacity by citizen needs.

Government to Business (G2B), once government has fulfilled its obligation to citizens, researchers turn to government to business (G2B) models. These aid businesses to find business partners, to share information online, and to access legal and administrative support. Finding a business partner in government and in city services, the objective was to connect government and industry. It was aimed at initiating collaboration over multiple dimensions, to achieve tasks that are impossible unless both sectors collaborate. Informing companies about business events, these include public calls, exhibitions, fairs, seminars, and conferences. The digital platform updates all agendas; no service yet performs such work. Providing companies with legal and administrative support, government laws, regulations, and procedures are complicated and consume a lot of time. Digital platforms can offer online consultations that ease these burdens on companies.

Government to government (G2G), G2G

platforms support co-ordination and co-operation between agencies. Usually, each governmental organization has a unique information system (a digital platform), but such isolation is problematic when agencies wish to collaborate, between government agencies supports effective and efficient decision-making. Apart from lacking interoperability, governmental organizations are usually characterized by rigid, cryptic, vertical hierarchies (Weber, 1946), which trigger citizen disaffection. The new approaches include smart governments, open governments, and digitalization that provide more openness, transparency, and flexibility, restoring trust in the government sector Enhancing government electronic interoperability: Digital platforms enhance the ability of government to initiate knowledge transfer between agencies. Digital platforms simplify information exchange. Preferably, each government agency should have only one digital platform to share information. Notifying government employees of professional events: Digital platforms alert government employees to events, seminars, or fairs relevant to their jobs. This allows employees to upgrade their skills and become promoted. This is e-management of government human resources. This paper is focused on relationships between government and citizens (G2C) and government and business (G2B), highlighting how digital platforms can improve the quality of citizen life. Digital platforms are not limited to the creation of new markets; they also aid transparent policy-making. The cases illustrated facilitate understanding and definition of the relationship between a digital platform and a smart community.

Conclusions

In this article, the main goal was to understand how different types of digital platforms support the digital community. As shown by Paudyn (2014, 2017), many governments and companies believe that technology can supplant governance and human responsibility. However, a platform may be explicitly for citizens. This work commenced with a definition of a digital platform, followed by a brief explanation, classification of digital platforms, the interactions of stakeholders, and the important concept of citizen participation in the development of services. As research proceeds, the digital platform will evolve in terms of structure and can then be applied in many ways, including government to citizen (G2C), government to business (G2B), and government to government (G2G). A few case examples highlight the potential of digital platforms. They not only help citizens receive effective and efficient services, and develop smart communities, but also aid the government and private sectors. In addition after we define each characteristic we differentiate the strategy used in the development of specific characteristic (Lee and Leem, 2016)

Although digital platforms offer many benefits, some issues remain. The principal issue is that actors with limited knowledge sometimes render applications of digital platforms difficult. Safety issues are also in play; digital platform data breach is of major concern. Platform security must be updated regularly.

In further work, we will focus on feedback on, and examples of, G2B and G2G platforms to show that the effectiveness of digital

platforms is not limited to the G2C realm. Also, more cases are needed to gauge the true impacts of digital platforms when seeking solutions to real world problems.

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