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Beyond the boundaries: Challenges for business, policy and society

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ABSTRACT

This editorial article introduces the papers presented at the ITS Seoul 2018 and seven papers selected for the special issue of ITS Seoul 2018. Specifically, this article provides the results of keyword networks, research agendas and coauthor networks of ITS Seoul 2018. A summary of the seven papers accepted for the special issue of ITS Seoul 2018 is also included. Finally, this article concludes by introducing another paper that empirically explores the value of special issues by analyzing the characteristics of special issues of *Telecommunications Policy*.

1. Introduction

Information and communication technologies are radically transforming products, industries, and ultimately people's lives. The development of smart connected products creates a new paradigm wherein traditional businesses are redefined, new industries are created, and means of creating value are modified (Gómez-Barroso, Feijóo, Quiles-Casas, & Bohlin, 2017). To satisfy the fragmented needs of media consumers, boundaries between industries are blurred and the clear distinction between online and offline services has faded. Persistent efforts to develop the Internet of Things (IoT) have also contributed to this radical shift in the ICT environment. With numerous sensors connected to autonomous products, the IoT is capable of collecting big data and creating new opportunities for a smart society and smart lives. While new innovations provide creative opportunities, they are accompanied by risks and challenges. Thus, the role of government and regulatory policies as well as firms is critical in creating a healthy ICT environment. The 22nd Biennial Conference of the International Telecommunications Society (hereafter ITS Seoul 2018) was held to understand how firms, governments, and society should respond and contribute to the healthy development of the ICT ecosystem, under the theme of *Beyond the boundaries: Challenges for business, policy and society*.

ITS 2018 Seoul solicited 166 papers based on a comprehensive main theme with session streams as follows: 1) Broadband and the next generation network; 2) the Internet of Things; 3) Content and applications; 4) Innovative ICT business models; 5) Policy and regulations, and 6) ICT and global society.

This editorial article begins with a word cloud summarizing the keywords of ITS Seoul 2018. Then, we present the outcomes of topic modeling using the abstracts of the papers presented at ITS Seoul 2018 and describe the main research agendas of the conference. We also report the results of the coauthor network analysis, then discuss research performance across regions and organizations. Finally, we provide a summary of seven papers accepted for the special issue of ITS Seoul 2018 and concluding remarks.

2. Main keywords and agendas

2.1. Analytical framework

To understand the overall characteristics of the keywords of the ITS Seoul 2018 papers, we applied a network analysis approach and related measures such as degree centrality (the number of neighboring nodes to which the focal node is connected) and betweenness

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centrality (the extent to which a node lies on the paths between other nodes) (Kim, Kim, & Kim, 2008; Kwon & Kwon, 2017).

Initially, 166 submitted papers were considered to be the data pool for our analysis, but 59 papers were dropped or rejected in the review process. Thus, we focused on 107 papers included in the ITS Seoul 2018 proceedings. Fig. 1 shows the network analysis procedure. First, we extracted major keywords from the abstracts of the 107 papers and analyzed the network of connections between the keywords. The key agenda was derived through Topic Modeling Analysis. Finally, we investigated the coauthor network based on the affiliations of the authors.

2.2. Keyword networks

To analyze the keyword network, we used Cyram's Netminer 4. A total of 2591 keywords were extracted after processing exclusions, synonyms, defined words, and similar word forms. Fig. 2 shows the word cloud of ITS Seoul 2018 keywords. Keywords such as "market," "media," "country," "network," and "platform" appeared most frequently.

Fig. 3 shows the keyword networks that cooccur five or more times. In Fig. 3, the size of the circle indicates the number of times a keyword appears, and the link can be interpreted as showing a strong relationship between the two keywords, meaning that the two keywords appeared together in a specific paper. As Fig. 3 shows, the word "media" plays an important role in connecting "offline," "device," "market," and "device." It can be inferred that recent research trends address the role of media in various industrial areas.

In the upper right-hand corner of Fig. 3, there is a node consisting of "economy," "digital," and "divide" and links between the words. As the digital economy spreads, the influence of tech giants, such as Google and Facebook—which have a large number of users and huge volumes of data—is increasing. These tech giants are increasing their influence not only in our daily lives but also in all areas of society, economy, and culture. They have become so dominant because they benefit from "network effects." For example, Google dominates the global search market and Amazon captures over 40% of online shopping in the United States. Because the tech giants raise concerns about fair competition, quite a few papers submitted for ITS 2018 Seoul seem to investigate this issue.

Meanwhile, the relationship between the Internet and artificial intelligence (AI) can be confirmed. There was another link between "China" and "AI," which may indicate that many scholars are interested in AI in China. In addition, a cluster of keywords such as "network," "externality," "neutrality," and "effect" may reflect revisits of the net neutrality arguments over the 5G network in the US and Europe.

3. Research agendas

We investigated the key agenda of ITS Seoul 2018 through topic modeling. Topic modeling is one of the statistical modeling techniques used to discover abstract "topics" in various documents (Blei, 2012). Topic modeling has been widely used in many fields such as information science, data mining, journalism, and communications.

The most typical topic-modeling technique is Latent Dirichlet Allocation (LDA). LDA is a stochastic process used to extract a set of highly probable words by calculating the probability that those words will be included in a topic (Bastani, Namavari, & Shaffer, 2019). We constructed a document–term frequency matrix using extracted nouns for each document. Afterward, the LDA model was derived using Netminer 4. The learning parameter values for model elicitation were set to window size = 3 and extracted words by topic = 100. In addition, the hyperparameters were specified as alpha = 0.1 and beta = 0.01. The number of iterations of learning was set to 50 because the cost function converges after 50 or more iterations. Other parameters were the defaults recommended by Netminer 4.

We set the total number of topics at 10 and the most common keywords for each topic are shown in Table 1. Some agendas had already been identified in the keyword networks but we found new ones such as *intention to use and loyalty* and *ICT regulation*.

We named each topic to reflect the terms used in each topic best. For example, for Topic 1, a new agenda called *Intention to use and loyalty* was found based on keywords such as relationship, video, intention, ring, and loyalty. In the same manner, other topics were named as follows: Topic 2—*Dominance of Google and Facebook*; Topic 3—*ICT regulation*; Topic 4—*The NGN spectrum*; Topic 5—*SMPs (Social media platforms) and AI*; Topic 6—*US Cable acquisition*; Topic 7—*Threats or benefits to incumbent*; Topic 8—*News and media*; Topic 9—*EU citizens*; Topic 10—*Startup ecosystems*. Table 1 shows that intention to use and loyalty, ICT regulation, threats to incumbents, and SMPs and AI were key research agenda items for ITS Seoul 2018 (see the right-hand column of Table 1).

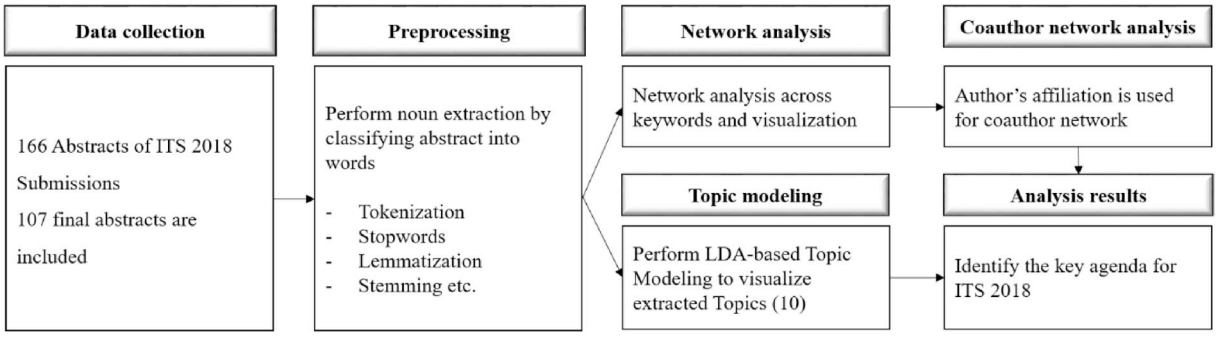

Fig. 1. The Framework for Network analysis.

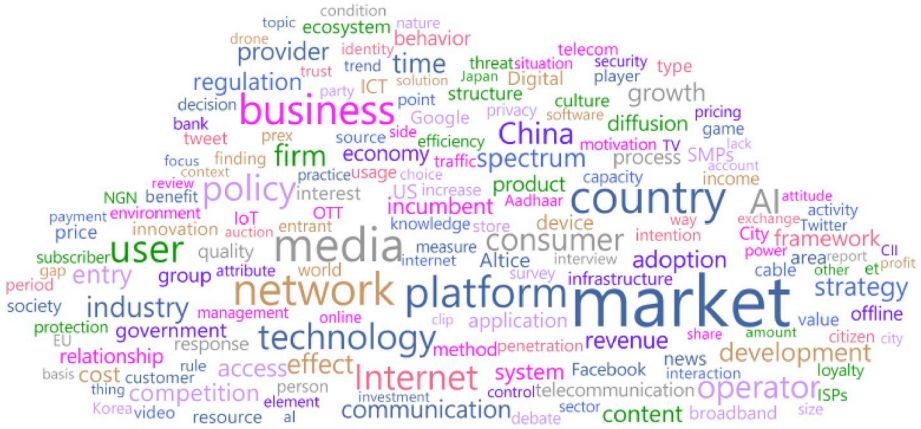

Fig. 2. The word cloud of ITS Seoul 2018 keywords.

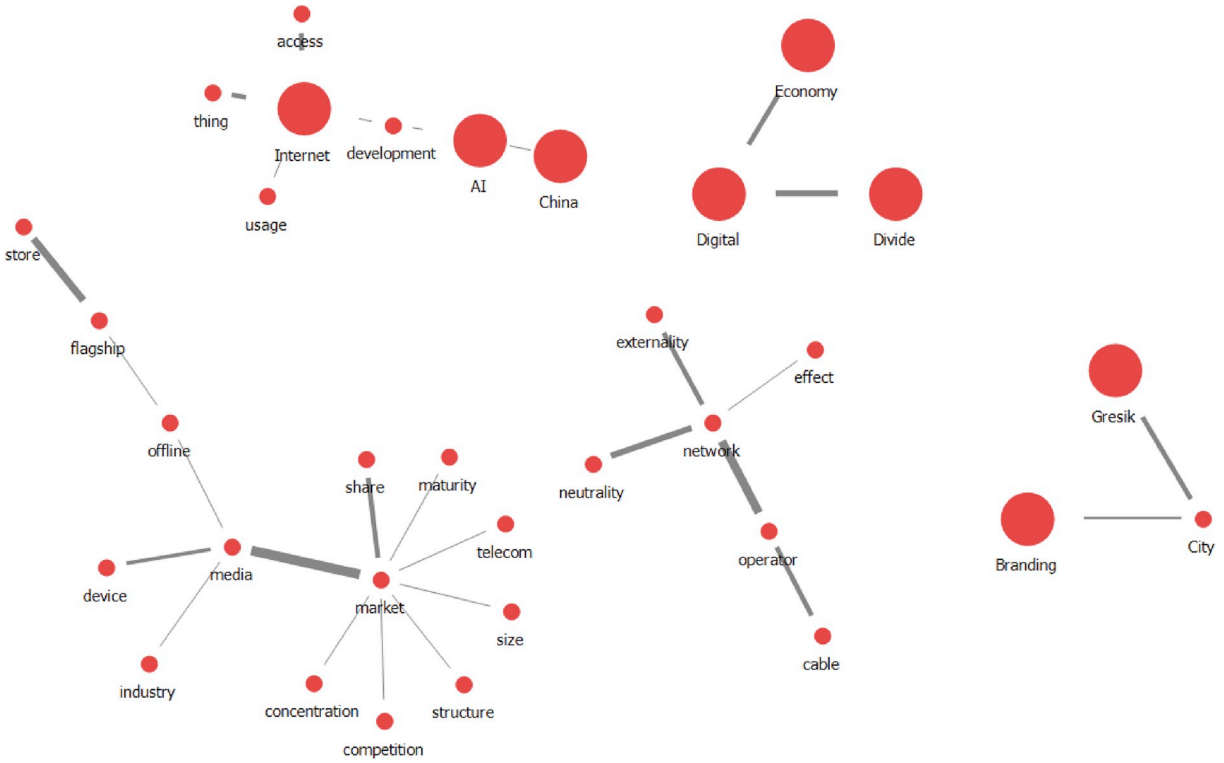

Fig. 3. Keyword network of ITS Seoul 2018

4. Coauthor networks

Using author information from submitted papers, we conducted a network analysis of the concurrent works of the organizations with which the authors are affiliated. A total of 144 institutions (colleges, enterprises, and institutions) were identified in the authors' affiliations from the 107 papers.

Table 2 shows the number of papers for each organization. Korean universities such as Korea University, the Korea Advanced Institute of Science and Technology (KAIST), and Seoul National University are the top institutions in terms of the number of published papers. They were followed by Beijing University of Posts and Telecommunications, LIRNEasia, Aalborg University and others.

In addition, we conducted a collaborative coauthorship network analysis of the organizations to which the authors belong. Although there was little interorganizational cooperation, the analysis should that KAIST and Korea University were intermediaries for interorganizational cooperation. Fig. 4 identifies international collaboration networks of India–China–Korea, USChina–Korea, US–-China, and US–South Africa.

Table 1
Top five keywords for each topic and number of related documents.

Topic discovered	1st Keyword	2nd Keyword	3rd Keyword	4th Keyword	5th Keyword	# of documents
Topic 1 (Intention to use and loyalty)	relationship	video	intention	drone	loyalty	15
Topic 2 (Dominance of Google & Facebook)	adoption	diffusion	Google	Facebook	penetration	8
Topic 3 (ICT regulation)	government	ICT	process	benefit	society	14
Topic 4 (NGN[a] spectrum)	spectrum	ISPs	traffic	store	broadband	10
Topic 5 (SMPs[b] & AI)	AI	China	Digital	SMPs	privacy	11
Topic 6 (US Cable acquisition)	Altice	U.S.	cable	Liberty	acquisition	4
Topic 7 (Threats or benefits to incumbents)	firm	entry	strategy	incumbent	price	14
Topic 8 (News and media)	media	news	tweet	culture	device	9

[a] Next Generation Network.
[b] Social media platforms.

5. Special issue of ITS Seoul 2018

After ITS 2018 Seoul, 32 papers were submitted for the special issue of ITS Seoul 2018, and seven papers were finally accepted after several rounds of reviews. These seven papers address a number of topics covered by ITS Seoul 2018 and all have a clear link with its main agenda, as shown in Table 3.

The first three papers in this special issue mainly focused on new emerging ICT ecosystems beyond existing industry boundaries and new killer innovations in the ecosystems. The first paper, *The evolution of the Internet of Things (IoT): A computational text analysis* by Bongsug (Kevin) Chae offers a digital innovation view of the IoT as a complex ecosystem of technologies, industry applications, concepts, methodologies, and social institutions that is temporally dynamic and evolves over time. By adopting a topic-modeling approach and extracting hidden trends from social media data, Chae found that the popular elements in the IoT ecosystem include cloud computing, big data, and cybersecurity. In the next paper, Tang, Jayakar, Feng, Zhang, and Peng enumerated the specific policies and programs that have been included in smart city initiatives. Through a comparative analysis of 60 municipal smart city plans drawn from countries around the world, they identified the projects that are most often combined and defined models of smart city development. Park, Nam, and Kim explored the "killer" services that are expected to be in high demand by consumers and keystone players in the emerging market. Their results showed that the most important service is driving assistance and that consumers regard smart cars as futuristic vehicles, yet continue to emphasize their conventional value as a means of transport.

The remaining four papers in this special issue considered how various stakeholders such as ICT firms and users have responded to the changing ICT ecosystem. In the fourth paper, Massaro investigated contextual factors that influence how business lobbying by corporate stakeholders is reflected in radio spectrum policy in the European Union (EU). Based on expert interviews, she raised issues such as lack of transparency and civil society underrepresentation, which are important for a better radio spectrum policy in the ICT ecosystem. Because environmental sustainability in the mobile communications industry can affect corporations, not only in the mobile ecosystem but also in other industries, Kim and Kim conducted a case study of three Korean mobile network operators (MNO). They found that the MNO have actively coped with environmental issues, and regulatory, mimetic, and normative mechanisms worked simultaneously in their environmental management. It is important to understand the factors that influence a seller's platform choice because the success of a platform in an e-commerce ecosystem is significantly dependent on the number of sellers and their quality. Thus Lee, Lee, and Ryu investigated features of an e-commerce platform that sellers value highly for selling their products, using a conjoint analysis based on an online survey of 1796 sellers using the Naver Smart Store in Korea. In the final paper, Kim, Choi, and Hwang focused on the circulation of user loyalty in the ICT ecosystem, where the boundaries between online and offline services have been blurred. They found that users who actively use mobile Instant Messenger (mIM) and emoticons are likely to visit the offline character flagship stores. Accordingly, they confirmed a virtuous cycle of loyalty from the online to the offline platform and vice versa.

Table 2
Top 10 organizations that submitted papers in ITS 2018.

Organizations	# of papers
Korea University	17
KAIST	12
Seoul National University	8
Beijing University of Posts and Telecommunications	8
LIRNEasia	7
Aalborg University	6
Pennsylvania State University	4
Chalmers University of Technology	4
University of Tehran	4
National Chengchi University	4

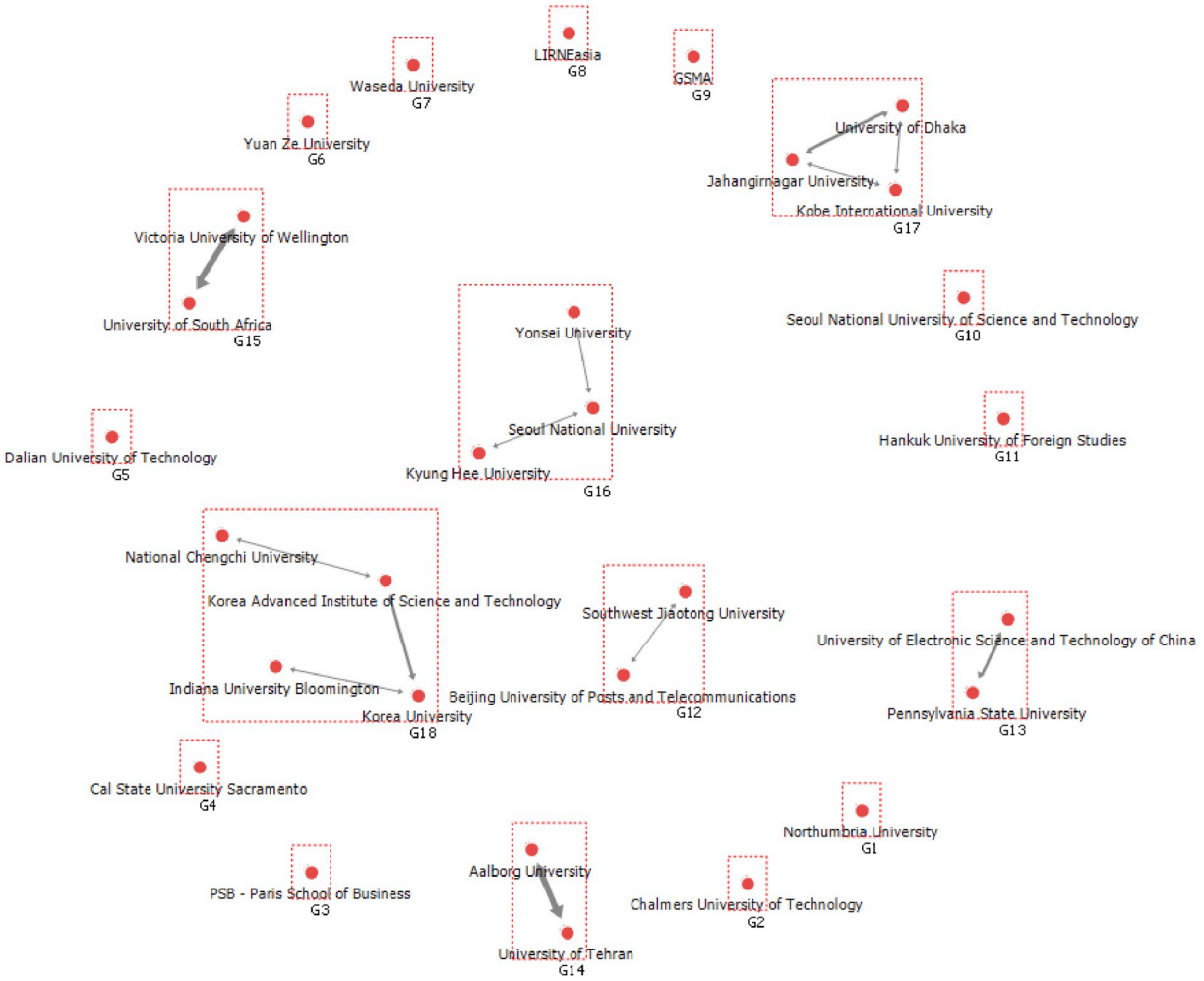

Fig. 4. Coauthorship networks of organizations.

Table 3
List of selected papers for the special issue of ITS Seoul 2018.

	Title of selected papers	Agenda related to topic analysis
1	The evolution of the Internet of Things (IoT): A computational text analysis	Topic 10 (Startup ecosystem)
2	Identifying smart city archetypes from the bottom up: A content analysis of municipal plans	Topic 10 (Startup ecosystem) Topic 3 (ICT regulation)
3	Exploring the key services and players in the smart car market	Topic 10 (Startup ecosystem)
4	Is business lobbying in the European Union context-dependent? Evidence from the policy field of radio spectrums	Topic 4 (NGN spectrum) Topic 3 (ICT regulation) Topic 9 (EU citizen)
5	An institutional analysis of environmental management in the Korean mobile communications industry	Topic 3 (ICT regulation) Topic 7 (Threat or benefit of incumbent)
6	How much are sellers willing to pay for the features offered by their e-commerce platform?	Topic 2 (Dominance of Google & Facebook) Topic 7 (Threat of benefit of incumbent)
7	Circulation of loyalty: Relationships between mobile Instant Messenger and the offline character emoticon store	Topic 1 (Intention to use and loyalty) Topic 8 (News and media)

6. Concluding remarks

In addition to these seven papers, we included a paper written by Lee, Kim, and Lim to make the special issue of ITS Seoul 2018 more special. Their paper empirically explored the value of special issues by analyzing the characteristics of special issues of *Telecommunications Policy* (TP). For their analysis, they collected all information on TP articles published from 1976 to 2018 from the Scopus database. They found that special issue papers perform better in terms of online captures and social media sharing while

general issue papers are cited more frequently in academia.

In summary, although the papers presented at ITS Seoul 2018 and the seven papers selected for the special issue provide interesting findings and have significant implications for understanding how business firms, government, and society should respond to the changing ICT ecosystem, it is clear that much additional research is required. We hope that this special issue will have a good level of online captures and social media sharing as well as frequent citations, and that there will be continued research on the theme of *Beyond the Boundaries: Challenges for business, policy and society*.

Acknowledgements

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.telpol.2019.101887.

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