

# THE ERA OF HYPER-CONNECTED SOCIETY AND THE CHANGES IN BUSINESS ACTIVITIES: FOCUSING ON INFORMATION BLOCKING AND ACQUISITION ACTIVITIES

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**Abstract** - A hyper-connected society is emerging in which various connections with people and people, things and people, things and things are amplified. The development and diffusion of the system and equipment for the hyper-connection is also rapidly taking place, and relevant media such as SNS and IoT are also frequently appearing. It is not uncommon that there will soon be a hyper-connected society where all things and people are connected. In the era when everything is really connected, it can be predicted that companies and consumers will be able to access a wide range of information, easily accessible to the enterprise. However, recent trends in corporate activities are somewhat different from these expectations. As the proposition, the activities of individuals are very active in related social media, but the activities of companies seem relatively passive. There are a lot of publicity posts on companies' homepages, but there are not so many ways to comment or reply to them. In addition, the system does not seem to replace traditional business activities when hyper-connected. Although online activities such as shopping malls are increasing rapidly, they do not completely ignore off-line activities such as the operation of sales outlets. The passive connection of these companies seems to be intentional rather than coincidental, which is against the active information access of consumers. It is becoming increasingly difficult for consumers to make direct calls or emails to company representatives. On the homepage, the phone number of the company representative is hidden, and it is becoming difficult to find e-mail and social media accounts. Although the contact information of the homepage person or the public relations person is seen, when making a telephone call, it is necessary to go through several gateways of the answering machine and the direct connection with the person in charge is difficult. In other words, consumers want to connect with the company's representative to get more information, but companies are afraid that exposure of corporate information through connection whether it lead to the leakage of corporate assets. Conflicts between consumers' desire to get the information they want through the connection and the company's efforts to block information are often expressed through internal corporate accusations. While a hyper-connected society can provide new benefits to those who have been unable to obtain information in the meantime, but corporations may need to seek information blocking measures. The passive connection of these companies can have a negative impact on consumers. Hyper-connectivity is defined as always on, always accessible, rich and versatile, interactive, accessible to people, not objects, and always stored. It has become an era when companies face the dilemma of actively responding to consumers' connections while blocking the exposure of important information utmost.

**Index terms** - Connected Society, Hyper-Connected Society, Social Media, Corporate Information, Information Blocking, Information Security

## I. INTRODUCTION

The 'hyper-connected' was first used by Gartner in 2008[1]. The hyper-connected society means a society in which people and people, people and objects, things and things, online and offline, one to one, one to many and many-to-many are connected using digital technology [2] or the digital based society that stores, analyzes, and manages data collected by sensors and mobile terminal through a network [3].

Half of the world's population, 3 billion people are Internet users in 2014, and the number of people using mobile devices is about 7 billion, which is 93.8% of the world's population, IP (Internet protocol) used in networks such as the Internet has been used more than 4.2 billion [4]. With the emergence of such a connected society, many countries are trying to spread their policies in order to follow them.

## II. THE ERA OF THE HYPER-CONNECTED SOCIETY

Under the name of the Fourth Industrial Revolution, Germany is making the greatest effort to make the smart industry. Until the mid-2000s, Germany's industrial strategy focused on securing the world's leading position in ICT convergence and embedded systems. Since then, they have focused on high-tech development and smart manufacturing process by introducing High Technology Strategy 2020 (2010) and Action Plan (2012). Moreover, in recent years, 'Smart Service World 2025' (March 2015) was announced with the aim of full implementation of digital ecosystem of the existing manufacturing smartization strategy, promoting smartness of the whole industry along with Industries 4.0. The Smart Service Strategy is a follow-up to Industry 4.0 and a prerequisite for the successful implementation of the Smart Factory. The German government has invested € 2.0 billion ('12 ~ '15) in technology and R & D infrastructure to build smart manufacturing and

service platforms for Industry 4.0 and € 50 million ('14 ~ '19) for Smart Service World 2025 [5].

The number of global IoT(Internet of Things) users was about 4.9 billion in 2015. In recent years, efforts to create new innovations and new values have been accelerated by utilizing networked machines and information in industry. It is expected that not only the manufacturing industry but also the service industry will be promoted in the Internet of Things (IoT). The M2M(Machine-to-machine) market was about 520 billion yen in 2015 [6].

It also brings tremendous performance to companies operating a network "platform" that forms the basis of a hyper-connected society. A platform is one of the underlying technologies of a network that a company creates and distributes. Many online products (such as applications) run on a platform. When a particular platform becomes popular, it becomes a standard, and this standardization further strengthens the dominance of the platform. Platforms are expensive to build. So the platforms are often built and maintained by large companies having high investment potential. Application creation involves both SMEs and large enterprises. The ability to attract and retain applications is critical to the success of the platform. An effective platform creates an interdependent ecosystem in which companies collaborate independently seeking their own goals [7].

Four profit-seeking global platforms of GAIA (Google, Apple, Facebook, and Amazon) are making a significant contribution to the hyper-connectivity era. Google's Android and Apple's iOS mobile operating system has helped developers reach a large number of smartphone users. Facebook has provided a platform for millions of individuals to build social networks. Amazon Web Services (AWS) has become a platform for large and small businesses using cloud-based resources. Nonprofit platforms include Wikipedia which promotes information sharing, and Github which shares open source software.

The system that has contributed to the development of the hyper-connected society is based on especially in the field of information and communication. Including the emergence of information exchange, the typical changes in equipment and systems are such as smartphones, ICT convergence, media convergence, the emergence of big data, and cloud computing [8].

	Status
Smartphone	<ul style="list-style-type: none"> <li>● In 2011, the number of smartphone users (1.5 billion) surpassed the number of PC users, and by 2015, the number of smartphone users (3.7 billion) was 1.3 billion more than the number of PC users (2.4 billion)</li> <li>● Since the launch of the iPhone (3GS) in November 2009, the</li> </ul>

	number of smartphone users has surged rapidly, exceeding 30 million by the end of 2012
ICT convergence	<ul style="list-style-type: none"> <li>● Various information and communication technologies converge and evolve through industries, services and devices</li> <li>● Various smart grid systems such as smart house, smart meter, smart home appliance, smart car, and smart parking system are introduced and daily life is incorporated into the Internet network.</li> </ul>
Real-time information exchange	<ul style="list-style-type: none"> <li>● WiFi, NFC (Near Field Communication) and RFID technologies are applied to mobile devices to exchange information easily and conveniently in real time</li> <li>● Payment service through mobile device is easy and various services such as mobile credit card payment, electronic money, account transfer using mobile device, discount card, coupon · membership card, is used more conveniently.</li> <li>● The change of ticket transaction type by using mobile device (paper ticket → electronic ticket), fundamental change of location method (paper map → real time LBS), real-time social media use (PC based → mobile based), consumption in Online service (online word-of-mouth → comment), online service through mobile (online to offline, O2O)</li> </ul>
Media convergence	<ul style="list-style-type: none"> <li>● Boundaries between traditional media in newspapers, TV and the Internet are collapsing.</li> <li>● Various custom media and services are produced and distributed by individuals.</li> <li>● Content consumption method changes from internet portal to direct (free) purchase using application store etc.</li> </ul>
Big Data	<ul style="list-style-type: none"> <li>● Due to the development of social media and data collection system, vast amounts of data are being generated, and the form of data varies not only with numerical data but also with text, images, sound, etc.</li> <li>● There are cases where new services are created using data that is not easily analyzed.</li> </ul>

	<ul style="list-style-type: none"> <li>● The need for professional systems and professionals to handle the big data generated in the connected society.</li> </ul>
Cloud Computing	<ul style="list-style-type: none"> <li>● Cloud Computing is being built to use data and applications across the network as big data storage, information security</li> <li>● Licensing issues for sharing are arise.</li> <li>● Reduced hardware and software purchasing costs, upgrade and maintenance costs.</li> </ul>

**Table 1**  
**Trend of environment change for information communication system for hyper-connection [8]**

The emergence of hyper-connected society is becoming a new opportunity and threat for consumers as well as corporations, and various forms are emerging to utilize them positively.

### III. CONSUMER ACTIVITY IN THE CONNECTED AGE

Consumers who are accustomed to the traditional market due to the emergence of the hyper connected age, are exposed to various opportunities and crises. It has the advantage of being able to access a wider market, accessing more information faster, but at the same time being exposed to risks such as transaction fraud, uncertainty and lack of trust due to inaccurate information.

In other words, consumers have been able to access a vast amount of information, but the accuracy and reliability of the information has fallen into new difficulties that cannot be regarded as higher advantage than face-to-face transactions in the past. In order for consumers to make purchasing decisions, it is important to increase the reliability of information in the hyper-connected society [9].

	Traditional society	Information society	Hyper-Connected society
Decision Base	Experience	Relay Platform	Data
Transaction target	Restricted person	Connected person	Connected person / things / service
Influence of trust	Social (transaction) cost reduction	Increase of transaction	Expansion of connection
Effect of trust	Transaction activation	Explosive increase in trading market	Relax uncertainty of transaction (data)

**Table 2**  
**Consumers' Decision Making Factors and the Role of Trust [9]**

In addition, consumers should be able to make meaningful agreements or explanations about the data producers and various accessible data, because they cannot make decisions if they cannot interpret the data even though they can access it [10]. Therefore, although consumers have been able to access data at the big data level, the initiative for the interpretation of the data is still in the producers of the data (mainly enterprises), which causes new difficulties for consumers in decision making.

### IV. BUSINESS ACTIVITIES IN THE HYPER-CONNECTED SOCIETY ERA

The emergence of the hyper-connected age has given companies new opportunities by increasing accessibility of the global market and information. In the early years of connection era, new changes are required for the companies. In the early hyper-connected age, a lot of people and machines are connected. So the business environment inevitably changes. The connection between the company and the consumer will increase. But if the company keeps responding to a small number of customers in the past, the complaints of the consumer will increase. Zappos, which operates an online shoe store, has a remarkable increase in the number of consumers calling with the hyper connective age, but they have achieved high performance by guaranteeing maximum phone conversation. In the early years of connected society, corporate members should ensure that they act autonomously as members of an organism [11].

Robin Chase, who founded Zipcar, one of the leading companies in the early years of connected age, announced that the hierarchical form of companies for over 100 years had been changing from the hierarchical form to a new model as his company, Peers, Inc. for the power of the network-based platform growing [12]. If the traditional enterprise model has grown as big as possible to lower the transaction costs and realize economies of scale, the enterprise model of the new cooperation age claims the merits of large enterprises and SMEs are combined. In the new model, large corporations finance and standardize for large-scale platform construction and SMEs pursue localization, specialization and customization. In other words, the new model argues that companies can collaborate with each other to provide things that the other party can or cannot do, which enabling lower cost, higher efficiency, and faster expansion [7].

The recent rapid growth of such a hyper-connected society is not completely positive. As a typical side effect, cyber security problems are being addressed

by companies and government agencies as well. Recently information leakage has been spreading to all national events beyond individuals or companies. It is argued that the value of technology should go beyond human value and examine whether control is lost or not [13]. On the negative side of this hyper-connected society, companies operate a variety of information supplement policies to prevent internal information leakage. Research is also being conducted on companies seeking ways to minimize damage by considering the inadequacies of informatization [14]. This problem is not for the particular country. The leakage of corporate information is affecting various places such as administrative institutions, civil litigation, corporate governance [15]. Recently, companies are often removing phone numbers or e-mail addresses from corporate homepages. In many cases, it is possible to connect with the person in charge of specific business through on the representative phone number or e-mail. This can be interpreted as the fact that firms do not show a positive response to the hyper-connection.

people	communications, supporting the development of what has been termed the Internet of Things
Always recording	<ul style="list-style-type: none"> <li>• Service records, virtually unlimited storage capacities, miniaturized video cameras, global positioning systems, sensors, and more—combined with people’s desire to document their own activities—ensure that a large portion of everyone’s daily activities and communications are part of a semi-permanent record</li> </ul>

**Table 3**  
**Key attributes of Hyper-connectivity [17]**

Based on Fredette et al.'s claims [17], Hyper-connectivity is always on, always available, rich in information, interactive, (Interactive), not just about people, but also can be defined as always recording.

**V. THEORETICAL BACKGROUND**

**5.1 Hyper-connectivity**

The definition of hyper-connectivity is defined as the availability of communication anytime and anywhere using e-mail or mobile phones [16]. Whether Heckscher & Adler [16] defined mobile connectivity in the early days of connected era when mobile devices and networking technologies were not well developed, they noted that connectivity is overcoming space and time constraints. The definition of secular connectivity can be reflected more recently by Fredette's definition in the World Economic Forum 2012, as Table 3.

	Content
Always on	Broadband and ubiquitous mobile devices enable people to be connected to family, work, friends, avocations, obsessions
Readily accessible	A universe of mobile devices and personal computers links people and organizations together; these connections are increasingly available at any time and in any location
Information rich	Websites, search engines, social media, and 24-hour news and entertainment channels ensure that information—from the strategic to the banal—is always on hand, beyond anyone’s capacity to consume
Interactive	Hyper-connectivity ensures that everyone can offer input on just about everything
Not just about	Hyper-connectivity includes people-to-machine and machine-to-machine

**5.2 Information Security**

Information security refers to complementing information from people who cannot handle it [18]. In the connected society, it is increased that the possibility that outsiders have access to company information. Therefore, confidentiality that cannot be understood even if information is accessed, integrity that information cannot be modified arbitrarily. And a person is a basic element of availability to access information systems [19]. Factors related to the necessity of supplementing information include maintenance of normal function of information, protection of information assets, protection of personal information, protection of national confidentiality, and information ethics [20].

Information assets that are subject to information security include physical assets (such as systems), logical assets (software and data), and administrative assets (personnel, organization, etc.) [21]. Information of persons are included in the administrative assets which includes address, telephone number, e-mail, resident registration number, ID, bank transaction details, credit information, card number, resume, diary, criminal history, and medical records [22].

Businesses will secure their physical and logical information assets as well as the administrative assets such as contact person names, phone numbers and email addresses, which would not be exposed on the Internet homepage.

**VI. RESEARCH MODEL & PROPOSITION**

**6.1 Derivation of proposition**

Based on the theoretical background, the following propositions are presented.

[Proposition 1a] Consumers will actively acquire information about related companies when they decide to buy products.

[Proposition 1b] When selling products, companies will block their personal information more.

[Proposition 1c] Companies will be active in acquiring information from competing companies.

[Proposition 2a] The more hyper-connected society becomes, the more consumers will be more active in acquiring product information.

[Proposition 2b] The more connected society becomes, the more companies will block their personal information when selling their products.

[Proposition 2c] The more connected society becomes, the more companies will be active in acquiring information from competing companies.

### 6.2 Research model

Based on the theoretical background, the following propositions are presented

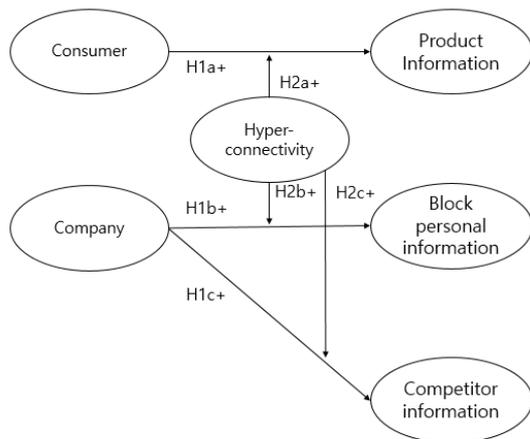


Figure 1: Research Model

## VII. RESEARCH METHOD

### 7.1 Study Method

Through the time series analysis, the propositions of the company's passive information disclosure activity according to the arrival of the hyper-connected society.

#### 7.1.1 Dependent variable

##### 1) Obtain company information

Consumers' efforts to acquire corporate information are measured by the number of visits to corporate websites and corporate social media.

##### 2) Disclosure of information

It is measured by the degree of disclosure of information on the company's homepage. It is measured by whether the personal information (phone number, name, department) of the person in charge of particular business of the company is exposed on the company's homepage and whether or not an organization related to the information is newly established. Retrieving contents of past homepage utilizes INTERNET ARCHIVE's Wayback machine (web.archive.org) as Figure2.



Figure 2: Apple's homepage in 1997 using INTERNET ARCHIVE's Wayback machine (www.archive.org)

### 3) Acquisition of competing company information

Analyze the business report of the target company to confirm whether the department related to information acquisition (economic research institute, overseas branch, etc.) is newly established.

#### 7.1.2 Independent variable

##### 1) Consumers

It is who intend to buy product and approach the company homepage of the product

##### 2) Companies

It is who intend to access the information of the competitive company.

#### 7.1.3 Moderating variable

##### 1) Hyper Connectivity

It is counted that how much(0 to 6)Connectivity (Always on, Ready accessible, Information rich, Interactive, Not just about people, Always recording) is achieved as Fredette et al [17].

## DISCUSSION

The purpose of this study is to analyze how consumers and companies respond to the acquisition of information by the emerging of the hyper-connected society. In the proposition setting process, an indicator to measure the hyper connectivity was

derived, and the contradictory situation of supplementing the company's own information and acquiring third-party information was explained. It is propositioned that this aspect is further strengthened by the emerging of hyper connectivity. The emerging of a hyper connected society, which is ambiguous and difficult to measure, is always on, always connectable, capable of communicating rich information, interacting with it, connecting to objects[17].

## CONCLUSIONS

It does not mean that society can connect any information at all. Strengthening connectivity can lead to ineffective disclosure of information by companies. This kind of passive information disclosure can cause inconvenience to consumers and may cause another transaction cost to the competitor in acquiring information. The significance of this study is briefly summarized as follows. First, the more hyper-connected society emerging, the information acquisition becomes more competitive. Second, competition related to acquisition of information can create additional functions of contradiction and add new transaction costs. Third, countermeasures against the increase in the transaction cost of society as a whole due to the fact that there is no mechanism to mediate this contradiction in the hyper - connected society. The limitations of this study are not based on the accumulated data, but the derived data. In addition, it seems that there is a limitation that the efforts to acquire information from consumers and companies can be evident.

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