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A Study on the Quantified Point System for Designation of Personal Identity Proofing Service Provider based on Resident Registration Number

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Abstract

In this paper, we propose to improve the designation examination criteria of agencies that provide personal identity proofing based on the resident registration number (RRN), a 13-digit number uniquely assigned by the government to identify Korean citizens. In online commerce, etc., the personal identity proofing agency (PIPA) is a place where online users can prove their personal identity by presenting an alternative means instead of their RRN. The designation examination criteria for PIPAs established in 2012 is a revision of the relevant current laws, and there is a problem in applying the designation examination for alternative means of RRN as the current examination standard. Therefore, in this paper, we propose a method to make the current examination criteria applicable to the newly designated examination of the personal identity proofing service provider based on the current RRN alternative method. According to the current designation examination criteria, only those who satisfy all the examination criteria are designated as the PIPA. However, in reality, it is not in line with the purpose of regulatory reform to require that all examination criteria be satisfied. In the proposed method, it is proposed to apply the standard score system for designation of PIPAs, to make the law current, to secure legal compliance, and to establish a new examination standard to provide a new alternative means of personal identity proofing service. By applying the proposed method to the PIPA designation examination, various alternative means of RRN can be utilized in the online commerce service market.

Keywords: *Personal identity proofing agency, resident registration number, designation examination criteria, online commerce service*

1. Introduction

Online commerce services are expanding through non-face-to-face due to the global pandemic of Corona infection. In particular, in non-face-to-face services, verifying the personal identity of online commerce users has become commonplace. In a non-face-to-face situation, the reason for verifying the personal identity of a commerce user is refund, consultation, point, delivery, etc., and to prevent financial damage, personal identity proofing is applied to various online services [1-3]. As shown in Table 1, it can be seen that the online shopping transaction amount in January 2022 announced by the National Statistical Office of Korea is increasing by about 11.5% compared to January 2021. Among them, more than 75.5% of transactions are made through mobile devices [4]. In this increasingly popular mobile-based online commerce service, it is necessary to check whether the personal identity of the mobile device subscriber and the user's personal identity of the mobile

device match.

Currently, in Korea, various online identification services are emerging to verify the identity of the owner of a mobile device. Techniques for personal identifying a user in a mobile device include knowledge-based, possession-based, and biometric-based [5]. In the knowledge-base, there are things that are verified with information that the user remembers, such as PIN and password. In the possession-based identification method, authentication is performed through the user's possessions, such as OTP or smart card. And biometric authentication-based personal identity verification methods include biological biometric authentication using the user's invariable physical characteristics (fingerprint, iris, etc.) as an authentication factor, keyboard strokes, and gait patterns [6]. However, offline, the most reliable method is face-to-face verification through a government-issued resident registration card. And, in the offline service, the most effective method is the face-to-face confirmation method through the resident registration card issued by the government. However, there is a problem in that, due to non-face-to-face transactions in online commerce, the identity of the service user cannot be directly collected.

Table 1. Online shopping transaction trends (KRW 100 million, %), Statistics Korea

	Jan. 2021	Jan. 2022	Compared to the same month of the previous year
Total transaction	148,371	165,438	11.5
Mobile transaction	106,354	124,978	17.5
Mobile transaction share(%)	72.4	75.5	3.8

Therefore, the concept of digital authentication was introduced to verify the identity of service users online, and it is currently used as an authentication concept that can confirm the identity of the counterparty in online transactions under the name of a joint certificate. Since 2012, the collection of RRNs of service users has been prohibited in Korea due to privacy issues. This made it impossible to identify users online based on their RRN. In the result, an identification method that can replace RRN was required for online user identification was required. As a result, the personal identity proofing service, an alternative means of RRN, was started [7]. The personal identity proofing service is a service that confirms the identity of the other party by designating the PIPA that can issue an alternative means of RRN designated by the government. In this case, the PIPA will provide the connecting information instead of the RRN as information about the personal identity proofing of the online personal identity proofing service user. Connecting information is an online RRN that is uniquely identifiable information that can uniquely identify the other party. Accordingly, if designated as the PIPA, RRNs can be collected in accordance with Article 23 of the 'Information and Communications Network Act.', and the right to create and provide users' connecting information is granted. Therefore, in order to grant the leadership of the PIPA, it is reviewed whether physical, technical, and administrative user protection measures are satisfied.

Currently, the PIPAs designated as alternative means of RRN include i-PIN, mobile phone, credit card, joint certificate, and electronic signature issuing institution [8]. However, from the point of view of users, more and more identification methods have appeared and they want to receive online services more conveniently. In order to be designated as the PIPA, various criteria must be satisfied, and all detailed criteria for each examination item must be satisfied. The reason is that, as it plays the role of creating, managing, and storing RRNs and connecting information, the organization is designated by focusing on the level of user protection rather than the convenience of use. It is due to the importance of the user information that is processed that much. Recently, it can meet the purpose of regulatory reform along with social changes, and it is trying to expand the alternative means of RRN in order to diversify the means of user personal identity proofing and to improve convenience. In the previous study [2, 7], only legal matters regarding the screening criteria for

identity verification agencies under the 'Information and Communications Network Act.' and the 'Notice on Designation of Identity Verification Institutions, etc.' were suggested.

The current personal identity proofing agency designation standards stipulate that, in collecting and utilizing users' unique identification information, it is necessary to examine whether safe information protection and reliable user identification are possible. In the criteria for designating such the personal identity proofing agency, technical protection measures, managerial measures, and physical access control are checked. In particular, if any one of the criterion for designating the personal identity proofing agency is not adequately met, it is impossible to designate personal identity proofing agency. In a situation where it is impossible to confirm whether the designation as the personal identity proofing agency is satisfied for the applicant for designation of a new agency, a process of preparing to satisfy all designation standards is required. In particular, introduction of new information systems, implementation of software authentication modules, and purchase of information protection equipment are required to designate current personal identity proofing agency. In fact, the standards for designating the personal identity proofing agency do not require a system to be prepared, but in reality, it is difficult to meet the designation standards without a corresponding information security system. In particular, it is difficult for the agency that has applied for the designation of a new personal identity proofing agency to prepare the relevant systems in advance without a confirmation of the designation of the personal identity proofing agency in a situation where enormous costs are required. Therefore, it is required to come up with a plan so that various alternative means can be activated in the online service market by partially easing the requirement to meet the detailed examination requirements in the current PIPA designation examination criteria.

In this paper, we propose a method to improve the criteria for designation of a personal identity proofing agency so that the current level of user protection can be satisfied while trying to enter the online service market through various alternative means through improvement of the current PIPA designation examination criteria. Through this study, various alternative methods for identification can appear in online services and can also suggest standards for designation of an identification agency that can satisfy the user's personal information protection level beyond the current level.

In Chapter 2, the processing flow chart of the personal identity proofing service is described, and the current personal identity proofing service agency designation criteria are presented. And in Chapter 3, the improved designation criteria of personal identity proofing service institutions are presented, and in Chapter 4, the conclusion is presented.

2. Personal Identity Proofing Service

As shown in Figure 1, the personal identity proofing service refers to a service in which identification information including one's SSN is provided to the PIPA to be identified and authenticated as the owner of the unique identification information and issued identification information. When a user requests an online service (membership, etc.) from the ISP to use the online service, the ISP asks the user in a non-face-to-face environment to verify their personal identity. In this case, the user provides the identification information issued by the PIPA to the PIPA to be identified and authenticated, and then the PIPA provides the identification information and connecting information to the ISP to confirm the user's identity [7]. For this reason, it is necessary to give the direction of the PIPA according to strict examination standards.
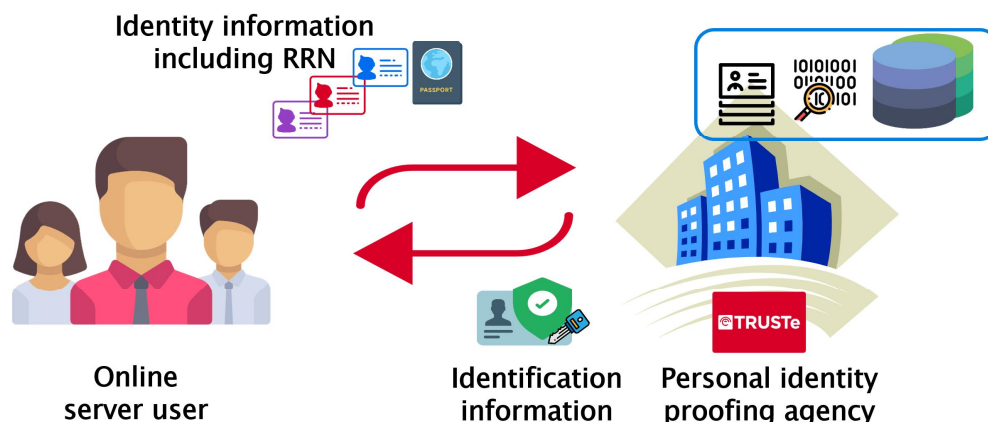
Figure 1. Overview of personal identity proofing service

2.2. Criteria for designation the personal identity proofing service

As shown in Table 2, the current examination criteria for designation of the PIPA are largely divided into physical, technical, and administrative action plans, technical and financial capabilities, and adequacy of facility scale, and consists of a total of 108 examination criteria. The examination criteria for the PIPAs are broadly divided into whether physical·technical·administrative protection measures are established, whether human and financial capabilities are prepared, and whether the size of the personal identity proofing facility is adequately prepared.

The examination criteria for physical, technical, and administrative capabilities include management and operation of facilities related to identification work, operation and security and management of systems and networks, user protection, response to emergency situations, and prevention of forgery of access information. In terms of human and financial capabilities, it is evaluated that there are 8 or more people, meet the technical manpower requirements, and the capital is 8 billion won or more. In addition, in terms of the appropriateness of the facility scale, personal information management and protection facilities, alternative means creation, issuance and management facilities, security facilities, and disaster prevention facilities such as fire, flood damage and power outages are evaluated.

As shown in Table 2, the current PIPA examination criteria stipulates that it can be designated as the PIPA only if all detailed screening criteria are met. However, in reality, it is close to impossible as it satisfies all examination criteria. Even now, if some examination criteria are not met during the designation examination by the PIPA, the items that are not met within a certain period are stored in the case of supplementation. Therefore, it is necessary to prepare a plan to strengthen the level of user protection by designating a conditional clause if the current designation examination criteria are met more than a certain level rather than the criteria for whether or not all examination items are satisfied.

Table 2. Outline of the criteria for the designation examination of the personal identity proofing agency

Items	Examination criteria
Physical·technical·administrative protection measures	1. Matters concerning the management and operation of facilities related to personal identity proofing work
	2. Matters concerning the prevention of information and communications network infringement

	3. Matters concerning the operation, security and management of systems and networks
	4. Matters related to user protection and complaint handling
	5. Matters concerning emergency situations and response to emergencies
	6. Matters concerning the establishment and implementation of internal regulations for personal identity proofing work
	7. Matters concerning securing the safety of alternative means
	8. Matters concerning the prevention of forgery and falsification of access information
	9. Separation of identity verification work from other Internet services
Human and financial capabilities measures	1. Technical manpower: 8 or more
	2. Technical manpower requirements
	3. Capital: 8 billion won or more
Physical protection measures	1. Facilities to verify, manage and protect users' personal information
	2. Equipment for creating, issuing, and managing alternative means
	3. Security facilities for access control and access restriction
	4. System and network protection facilities
	5. Equipment to prevent disasters such as fire, flood, and power outages

In the existing personal identity proofing agency designation system, it is stipulated that if any one of the total 94 screening criteria in Table 2 is not met, the designation screening will be eliminated. For this reason, it is very difficult to uniformly satisfy all designation standards without distinction of importance, etc. Eventually, it came to be recognized as a regulation that obstructs the designation of a new personal identity proofing agency. Due to the expansion of online services, it is required to provide personal identity proofing services using various authentication methods, but there are difficulties due to strict personal identity proofing agency designation screening standards. Recently, the latest technologies such as blockchain and self-sovereign identity verification have emerged, but there is a limit that cannot enter the market due to the current standards for designating the personal identity proofing agency. Therefore, it is required to devise a plan to supplement the current personal identity proofing agency designation criteria by classifying them in terms of service importance, even if there are some deficiencies.

3. Improvement of Personal Identity Proofing Agency Designation Criteria

In order to improve the examination criteria of the PIPA, it is necessary to define the personal identity proofing facility. Also, it is necessary to define the service related to the personal identity proofing service. Additionally, it is necessary to analyze the combination with other existing online services. In the case of an independently operated personal identity proofing service, it is sufficient to evaluate the safety of users' personal information protection, the appropriateness of operation of facilities, whether to protect users' rights and interests, and whether to secure technical safety.

The improvement of the PIPA designation criteria presented in this paper is shown in Figure 2. The current PIPA designation criteria are physical·technical·administrative protection measures, human and financial capabilities measures, and physical protection measures. The proposed PIPA designation standard consists of a total of four parts, identification business performance feasibility, workforce expertise, finance and reliability, and physical·technical administrative safeguards ability.
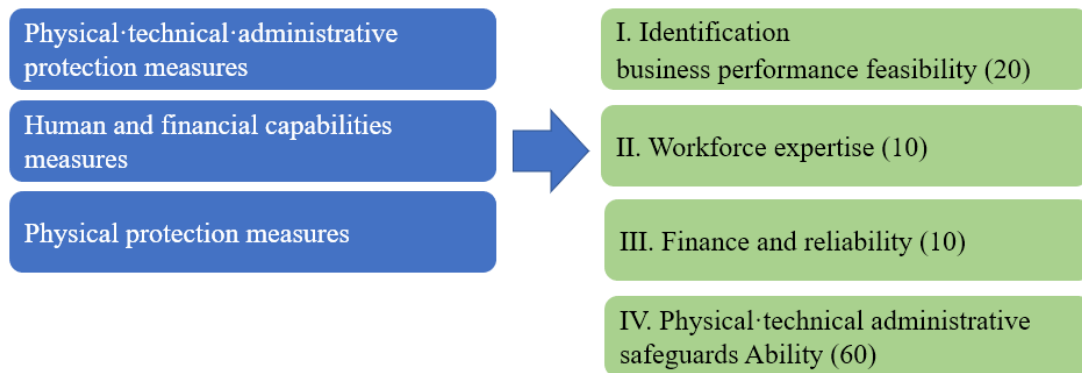
Figure 2. Improvement of proposed PIPA designation criteria

First, the items that meet the current examination criteria are changed to a score system. Second, the standards of conformity assessment are divided between designation assessment and conformity assessment, which checks whether or not the level of protection of the PIPA is satisfied after designation. Third, due to the importance of the PIPA, essential standards are prepared for examination matters such as the necessity of collecting user RRNs, the reliability of the authentication structure, and the validity of user protection measures. Fourth, the scope of the facility size of the PIPA is specified. Finally, the fifth specifies the scope of the personal identity proofing service. Table 3 shows the improvement plans for the designation examination criteria of the PIPAs.

Table 3. Improvement plan for the examination criteria for designation of personal identity proofing agency

Items	Examination criteria	Score
I. Identification business performance feasibility (20)	Necessity to perform personal identity proofing work	4
	Basis for collecting resident registration numbers	3
	Appropriateness of collection and retention of resident numbers	2
	Creation of alternative means and validity of issuance	4
	Reliability of self-authentication structure	4
	Consistency and conformity of investment plan	3
	Appropriateness of the composition of the dedicated organization and manpower	2
II. Workforce expertise (10)	Ratio of technical manpower above intermediate level	4
	Employment rate of technical manpower	2
	Education support system suitability	2
III. Finance and reliability (10)	Profitability and safety of financial structure	3
	Corporate Credit Rating	3
	Information security certification company financial ability	2
	Business support and damage compensation measures	2
IV. Physical·	Matters related to management and operation of related facilities	3

technical administrative safeguards ability (60)	Matters concerning the prevention of information and communications network infringement	5
	Matters related to system/network operation, security, and management	6
	User protection and complaint handling	8
	Matters concerning emergency situations and response to emergencies	5
	Matters concerning the establishment and implementation of internal regulations	5
	Matters concerning securing the safety of alternative means	10
	Matters concerning the prevention of forgery and falsification of access information	4
	Separation of personal identity proofing work from other Internet services	3
	Equipment for verifying, managing and protecting personal information	3
	Equipment for creating, issuing and managing alternative means	2
	Security facilities for access control and access restriction	2
	System and network protection facilities	2
	Equipment to prevent disasters such as fire, flood, and power outages	2

4. Conclusions

Due to the increase in online services, the use of personal identity proofing services based on alternative means of resident registration number is increasing. Currently, the personal identity proofing service using some specific alternative means is concentrated, so it is necessary to provide the personal identity proofing service using various alternative means. Therefore, we propose to change the requirements of the current personal identity proofing agency designation examination criteria to score system and to improve the examination criteria to secure the level of user protection and reliability of the authentication structure for some examination criteria. Through the proposed method, it is possible to diversify the personal identity proofing service, which will further strengthen the safety of users' online services and protection of users' personal information. In the future research, we will conduct a study on the evaluation method of the detailed examination criteria for each item of examination by the personal identity proofing agency.

Acknowledgement

References

[1]　A. Daniel, C. Hervé, C. Olivier, G. William, "Transforming Face-to-Face Identity Proofing into Anonymous Digital Identity Using the Bitcoin Blockchain", in Proceedings of the Annual Conference on Privacy, Security and Trust, pp. 25-34, 2017.
[2]　J. B. Kim, "A Study on Improvement method of designation criteria for Personal Proofing Service Based on Resident Registration Number", Journal of the Korea Society of Digital Industry and Information Management, vol.16, no.3, pp.13-23, 2020.
[3]　NIST, 2017. "Digital Identity Guidelines", https://pages.nist.gov/800-63-3/sp800-63a.html

[4] Statistics Korea, 2022. https://kostat.go.kr

[5] A. Abdulrahman, H. Chunqiang, A. Arwa, S. Tianyi, C. Xiuzhen, C. Dechang, "A Secure and Practical Authentication Scheme Using Personal Devices", IEEE Access, Vol. 5, pp. 11677-11687, 2017.

[6] K. Aravindhan, R. Karthiga, ''One time password: A survey", Int. J. Emerg. Trends Eng. Develop., vol. 1, no. 3, pp. 613–623, 2013.

[7] J. B. Kim, "Safety Improvement Methods of Personal Identification Services using the I-Pin", Journal of Information Technology Services, vol. 16, no. 2, pp. 97-110, 2017.

[8] G. H. Park, A study on the improvement of personal identity proofing service using alternative method of resident registration number : focusing on guaranteeing user's right to control personal information, M.S. Thesis, Konkuk University, 2020.

[9] J. B. Kim, "A study on the improvement of the criteria for designation of personal identity proofing agency using various identification methods in online commerce services", International Symposium on Advanced and Applied Convergence, pp.135-141, 2022.