

Derived Topics and Their Development from ICT-Based DPD Concept

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ABSTRACT

In this article, we present some derived subjects from the concept of ICT-based DPD concept for the safety of folk villages in both Korea and Japan. First, our deduced topic would rather be a monitoring system design of structures in folk villages. We, therefore, offer an integrated model of maintenance and management monitoring scheme. As another research subject, we submit safety sign or sign system installed in traditional towns and their standardization. We have draw up a plan to make signs upgrade applied to folk villages in Korea and Japan. According to our investigations, we should suggest and focus on flood in the area of traditional town in Korea. We present a water-level expectation model using deep learning simulation. We have applied this method to the area of ‘Andong Hahoe’ village which had been registered on World Cultural Heritage of UNESCO. The final goal of our research is to propose and realize an integrated disaster prevention and/or safety system based on big data concepts for both Korea and Japan.

I. Background: ICT-Based Convergence and Design Thinking

‘Creative Economy’ the greatest topic of Korea Government focused on ‘the strategy of ICT-based Convergence’ since 2013. Ministry of Science ICT and Future Planning announced ‘the Act of ICT Promotion’ which comes into effect on and after Feb. 2014. The total plan of it is called “ICT WAVE Strategy” including 5 Areas, 10 Core Technologies, and 15 Future Services as shown in Fig.1.[1].

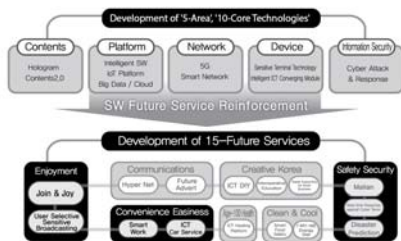


Fig.1. ICT WAVE Strategy: 5 Areas, 10 Core Technologies, and 15 Future Services

The main topic of this paper ‘ICT-based DPD’ which is also the same as our bilateral cooperative project between Korea and Japan[2], is directly related to the ‘Safety/Security’ services theme of ICT WAVE Strategy. In addition, services of ‘Enjoyment’ and ‘Convenience/ Easiness’ in the 15-Future Services are also closely connected with our topics.

Ministry of Trade Industry and Energy also announce ‘the Strategy of Design Industry Convergence’ which promotes design convergence with other industrial areas to create new industrial environments. Design Thinking in all kinds of ICT industries and convergence of software technologies can generate a new market, as a final result we can promote ‘Creative Economy’ as shown in Fig.2.

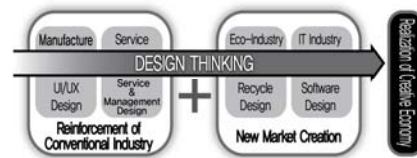


Fig.2. Design Thinking : Design Convergence with Other Industrial Areas Realizing ‘Creative Economy’

II. Deriving DPD Subjects and Topics

Depending on our pioneering paper[3], we have been investigating actual spots and the following test-bed sites:

- Andong ‘Haheo’ village in Korea (AHK)
- Asan ‘Oeam’ village in Korea (AOK)
- Chonju ‘Hanok’ village in Korea (CHK)
- Beppu ‘Onsen’ village in Japan (BOJ)

In addition, we focus on the following sites appropriate near-by test-bed for the themes of safety/security;

- Traditional Streets and Markets
- Safe Schools and Parks

We have been deriving the following topics which can be applied on the test-bed sites mentioned above;

- Design of maintenance and management monitoring system for safety of structures in traditional towns
- Safety signs and sign system standard in traditional towns in Korea and Japan
- Development of scientific model for expectation of water level in the area of traditional towns
- Integrated disaster prevention and safety system for traditional towns in Korea and Japan.

III. Safety Themes on Related Works

Recent mega-trend of design area is moving to human-oriented feature. And mega-trend of ICT area can be called ‘Convergence’ with other area. We combine design part with ICT part to be applied on

disaster prevention to generate our ICT-based DPD concept and its related industries. It should be expected that this converging advantages realize convenience/easiness features as well as safety/security themes at the same time as shown in Fig.3. In addition we can overcome the limitations of design contributions in products or services of applications using automation or feedback technologies like USN, UI, and big-data control etc.

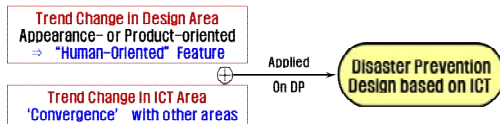


Fig.3. Convergence Concept of ICT-based DPD

ICT-based DPD concept and its applications can be apparently revealed by its scope and content when we approach to realistic activities in detail of application areas. We depict Fig.4 as a revised edition of scope and content of ICT-based DPD and their activities.

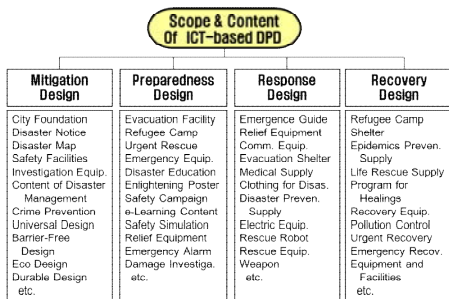


Fig.4. Scope and Content of ICT-based DPD

IV. Topics Referring Scope of ICT-based DPD

We have derived 4 different topics from the concept of ICT-based DPD which corresponds to each category of the scope with one-to-one corresponding manner. Although each topic has its independent goal and independent research team, they will be combined to be contributed for safety/security themes of test-bed sites mentioned above which can be considered as a purpose of ICT-based DPD. In addition, some of these results are just temporary because they have been studying since our bilateral project was started both in Korea and Japan.

4.1 Design of Monitoring System for Safety of Structures in Traditional Towns

The category that this monitoring system occupies in ICT-based DPD scope is 'Response Design' which includes communicate equipment, rescue equipment, and relief equipment as shown in Fig.4. It is relatively apparent to indicate this category for this topic even though other opinion of 'preparedness design' including urgent rescue is also possible. We recognize that our monitoring system mainly consists of ICT-based sensor networks responding to any extraordinary symptoms in a common situation rather than emergency so that we can classify it into 'Response Design'.

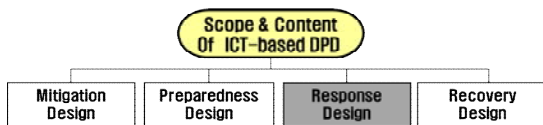


Fig.4. Category of the Monitoring System in ICT-based DPD

We focus on Andong 'Hahoe' Village (AHK) and

Asan 'Oeam' Village (AOK) for finding possible applications of our monitoring system described above. AHK and AOK are not only two representative folk villages in Korea but they have a lot of old structures to be monitored using the system, of which consist bridges, houses, and other structural facilities.

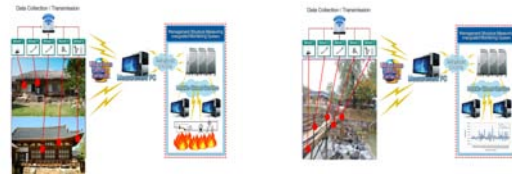


Fig.5 Applications of the Monitoring System for AHK/AOK

4.2 Signs and Sign System Standard in Traditional Towns in Korea and Japan

Safety signs and their system can be classified as 'Mitigation Design' category in the scope of ICT-based DPD including city foundation, disaster notice, and UD concept as shown in Fig.6. Barrier-free designs included in UD concept are also frequently referred.

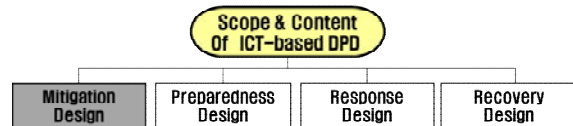


Fig.6. Category of Signs and Sign System in ICT-based DPD

4.3 Scientific Model for Expectation of Water Level

Fig.7 shows that the category of scientific modeling of water-level expectation is 'Preparedness Design' in the scope of ICT-based DPD.

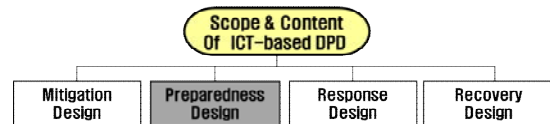


Fig.7. Category of Water-Level Simulation in ICT-based DPD

4.4 Integrated Disaster Prevention and Safety System for Traditional Towns

Fig.8 shows that the category of integrated safety system is 'Recovery Design' in the scope of ICT-based DPD.

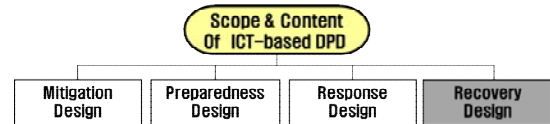


Fig.8. Category of Integrated Safety System in ICT-based DPD

References

[1] Ministry of Science, ICT and Future Planning, ICT R&D Mid/Long-Term Strategy 'WAVE'(2014~2017), Oct. 2013. <http://www.msip.go.kr/web/msipContents/contentsView.do?catId=mssw311&artId=1212954>

[2] Yong-Sun Oh, "ICT-Based Disaster Prevention Design and Its Applications," Proceedings of the 8th International Disaster Risk Management Conference, Chiba, Japan, July17,2014.

[3] Hwang-Woo Noh, Keiko Kitagawa, and Yong-Sun Oh, "Concepts of Disaster Prevention Design for Safety in the Future Society," International Journal of Contents, Vol.10, No.1, pp.54-61, March 2014.