

Discovery of village resources in urban regeneration project based on big data analytics



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ABSTRACT

In this study, we examined resources at the local level, conducted status research, and explored alternatives based on big data analytics to regenerate a village in a small area in an information communications technology-based urban regeneration project. In particular, we used big data analytics to analyze the current conditions of the local area and provided a case demonstrating how connecting with a local university for expertise could solve current local problems. The main results can be summarized in three dimensions. First, there is job creation in villages using woodworking. At the center of it, it is possible to link with youth entrepreneurship by using the clubs of the local university (Seangnori Research Institute). Quantitatively, it is possible to design offices and offline stores for the sale of developed products, and qualitatively, it can lead to company growth by increasing the business volume of pre-land transportation-type social enterprises and expansion of regional governance through regional exchanges. Second, in terms of providing new information and education, it is possible to provide the Chungnam Appropriate Technology Federation, a non-profit organization in the region, for smooth education and practice. In particular, it is possible to promote the growth of the council through continuous product development. It is possible to strengthen the cooperative system. Third, the effect of the influx of population within the region can be obtained. As publicity and awareness of the visionary workshop project have been expanded, the youth independent talent nurturing process is systematized, and from this, students graduating from local universities can lead to youth jobs in the local area without looking for jobs in other areas, forming a virtuous cycle system. To this end, we divided real estate big data into the categories of system, technology and data, law and policy, structured data of real estate information and unstructured data of social media, web log data, smart device, and real estate policy, development, appraisal, and local analysis to apply to the case area and suggest implications.

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1. Introduction

Korea is implementing more scalable regeneration projects by combining local urban regeneration projects with technological innovations brought about by the Fourth Industrial Revolution (Kim and Shim, 2019). In particular, research on village resources is conducted by local universities to create urban regeneration (Risi and Schipani, 2018).

Korean universities have grown and expanded along with the growth of the Seoul metropolitan area (Shim and Kim, 2020). Universities located in the Seoul metropolitan area were once slightly outside the city center but gradually began to play a central role in the city as it grew and expanded. Local communities developed around universities have changed over the past 70 years, and bigger universities are expanding into their boundaries (Buchanan et al., 2018). Accordingly, other regions show situations similar to that of the Seoul metropolitan area. Recently, universities have been recognized as important actors in the city center that can be partners for urban regeneration (Oke and Fernandes, 2020), promoting the local economy and improving the housing environment. When it comes to revitalizing the areas surrounding universities in

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Korea, plans have typically only physically targeted a certain scope, such as commercial areas near universities, and it has been difficult to promote the functions of all the surrounding areas. In some ongoing village building projects in which universities and local areas collaborate and find directions to boost local communities (Park and Leydesdorff, 2013) and especially for village regeneration in small areas, connecting with universities for expertise in addition to discovering resources and investigating and analyzing their current status is important. As the most effective alternative, it is necessary to approach various cases of cooperation between university campuses and local communities from the economic and socio-cultural perspectives of the community (Kim and Kwon, 2016; Ma et al., 2021).

In particular, in relation to the characteristics of the area where the university campus is located, the university's planner role and the cooperation of the university-public-community are premised on infrastructure for revitalizing the local economy and improving the residential environment. In addition, the expected effect can be considered in terms of spatial scope in terms of community revitalization through university leadership, the creation of cooperative relationships between universities and local communities, and the creation of campus towns in terms of urban planning.

In particular, in a city with a mononuclear structure on the scale of a small town, it is premised that the concept of planning for campus growth can be newly expanded beyond the university-owned site to the space of the neighboring community closely connected with the university. Hence, this study uses big data analytics to examine available local resources in an information communications technology-based urban regeneration project, reviews how such resources could be used in connection with a local university, and discusses the process of overcoming urban development, expansion, aging, and regeneration with a local university. To this end, we establish practical guidelines to identify village resources, the relationship between the local university and community, and programs that connect the two and provide options for the promotion of urban regeneration in the local area.

2. Overview and status of the urban regeneration new deal project

2.1. Background of the urban regeneration new deal project

Starting in the 2000s, cities in Korea began shifting their urban policy paradigm toward urban regeneration to overcome the limitations of urban aging and quantitative urban growth and improve the quality of life among locals (Baik and Kim, 2017; Oke and Fernandes, 2020). The government legislated the Special Act on Promotion of and

Support for Urban Regeneration in line with this paradigm shift in urban policies and pursued urban regeneration projects as part of the national policy. While urban regeneration projects lack long-term planning and a national-level push, the Urban Regeneration New Deal Project supplements shortcomings in such projects and moves closer toward the concept of "urban regeneration." Beyond simple housing renovation, the Urban Regeneration New Deal Project improves the physical environment in the decrepit old city center and old housing areas (hardware project) and builds the capacity of residents (software project) to overcome the limitations of urban regeneration projects, revitalize the city led by the community, and raise urban competitiveness. It aims to deliver housing welfare, restore urban competitiveness, and create jobs for social integration through the three strategies and five tasks in its roadmap. Table 1 shows the roadmap of the urban regeneration new deal.

Regarding the types of the Urban Regeneration New Deal, two small-scale housing projects, community revival, and housing support, have been added and three others are also described in Table 2. Table 2 shows types of urban regeneration in the new deal.

2.2. Directions of the urban regeneration new deal project

The Urban Regeneration New Deal Project is implemented with four goals to strengthen urban competitiveness. Most of the projects have similar issues and solutions related to old housing, parking, road, safety, aging, community, and environment. Table 3 shows the basic directions and goals of each project.

2.3. Local regeneration and expertise from universities

This study approaches diverse collaboration cases between universities and local communities from the perspectives of urban planning, economy, society, and culture. Regarding the social and economic dimensions of university campuses, universities' roles as planners and collaboration between universities, the public sector, and local communities can help boost the local economy, improve the housing environment, and establish pedestrian-friendly roads and streets.

Furthermore, this study examines the value and spatial scope of approaches to boost the local community through leadership from the university, establishing a collaborative relationship between the university and the local community, and building a campus town in terms of urban planning. For a small-scale monocentric city, we suggest establishing plans for the growth of a university campus by newly expanding into the adjacent local community closely linked to the university beyond its own land. This approach can connect a university and its

surrounding areas culturally and functionally, which means that the expansion of the campus through reviews of Korean universities' masterplans can provide interconnected functions by establishing a community between the university and the local area under the principles of preserving the natural environment.

This study elaborates on why it is necessary to expand on this planning concept by demonstrating

that a university campus can serve as an actor in urban regeneration for the local community and expand into its spatial scope. Hence, this study is differentiated from others as it defines local community regeneration within the scope of urban regeneration by connecting with a local university, selecting a hub for shared growth between the university and community, and suggesting alternative strategies.

Table 1: Roadmap of the urban regeneration new deal

Policy goals	Three strategies	Five tasks
Improve the quality of life	Innovate urban spaces	Regenerate the housing environment for old low-rise houses
Restore vitality in cities		Establish the old city center as a hub of innovation
Create jobs	Boost the urban regeneration economy	Establish the urban regeneration economic ecosystem
Restore communities	Led by residents and local communities	Build grassroots urban regeneration governance
Achieve social integration		Preemptively respond to gentrification

Table 2: Types of urban regeneration in the new deal

	Housing regeneration		General neighborhood	Downtown	Economic center
	Community revival	Housing support			
Legal basis	Special Act on Balanced National Development	Special Act on Promotion of and Support for Urban Regeneration			
Target	Dense area of small-scale low-rise houses	Dense area of low-rise houses	Area of store streets and houses	Area of commerce, startup, history, tourism, culture, and art	Area of train stations, industrial complexes, and ports
Characteristics	Small-scale residential	Residential	Semi-residential	Commercial	Industrial
Period	3 years	4 years	4 years	5 years	6 years
Area	50,000 m ²	50,000 – 100,000 m ²	100,000 – 150,000 m ²	200,000 m ²	500,000 m ²
Description	Rebuild old houses, supply public facilities, and amenities (road repair)	Rebuild old houses, reorganize alleys, and build parking lots and amenities (new roads, larger lanes)	Establish community hubs by using old or idle public facilities	Build facilities to promote public functions and commercial areas	Upgrade infrastructure and build anchor facilities

Table 3: Basic directions and goals of each project

	Key element	Description
Basic directions in the Smart City Challenge Project	Comprehensiveness	Comprehensively identify solutions to holistically solve urban problems
	Innovation	Discover new innovative and effective solutions rather than traditional ones
	Universality	Identify solutions that can be felt by the general public and are scalable and applicable across other regions
	Connection	Connect and create synergy with smart city-related projects led by the central and local governments
Goals of the Urban Regeneration New Deal Project	Flexibility	Prepare stepwise measures to demonstrate and advance solutions within the project period (four years) considering technological and institutional changes
	Deliver housing welfare	Rebuild old houses in a poor residential environments, expand basic infrastructure, and provide affordable public housing
	Restore urban competitiveness	Establish a hub of innovation in the old city center and regenerate urban functions to restore urban competitiveness
	Achieve social integration	Build resident participation governance, establish a virtuous cycle of benefits, and encourage coexistence between landlords, tenants, project operators, and residents
	Create jobs	Provide job creation spaces for work, commerce, and startups and create local community-based sustainable jobs including urban regeneration economic organizations

2.4. Local regeneration and expertise from universities regional innovation system and the role of local universities

Intensifying competition following globalization and the transition to a knowledge-based economy has highlighted the importance of knowledge and innovation as the driving force for economic

development. In a narrow sense, innovation refers only to technological innovation (product and process innovation), but in a broad scope, it includes not only technological innovation but also management, marketing, and institutional innovation (market development, formation of new industrial organizations, etc.). There have been various discussions about how gender creates

innovation. Depending on the creation method, innovation can be divided into innovation created through everyday activities such as learning through execution, the innovation that occurs by intentionally changing a product through existing knowledge, and innovation that creates new knowledge to achieve a specific purpose.

This can be the argument that innovation does not simply follow the linear mechanism that leads to original technological innovation, applied research, commercialization, and mass production, but appears through interaction and learning among various economic actors in all fields such as knowledge creation, diffusion, and utilization. In particular, [Lundvall \(1988\)](#) argued that the creation, diffusion, and utilization of knowledge can be organized like a series of systems through the national innovation system, stating that the creation of innovation lies in the continuous interaction and learning between actors. In other words, innovation can be created by organizing various elements such as support systems, infrastructure, market conditions, and education and training to support this as well as various interconnections between innovation actors for the creation, diffusion, and utilization of knowledge into one system. Meanwhile, as localization began to be emphasized as a new response to globalization, regions began to be rediscovered as a driving force for technological innovation and economic growth from the early 1990s.

The importance of regional development-related research to explain the regional distribution and policy impact of regional high-tech industries and technology complexes, innovation networks, and innovation programs was highlighted, and the formation of industrial clusters or the emergence of regional countries according to post-Fordism A new paradigm has also emerged that emphasizes the importance of regions for socio-economic adjustment. In addition, regional research, which had been independently developed until the early 1990s, was gradually integrated into the direction of defining regional existence centered on technopoly, providing an opportunity to develop into regional research in which corporate networks, technology transfer, and specialized training were linked. The rediscovery of regions means that the spatial scope of innovation needs to be defined on a regional basis, not on a national basis. [Cooke et al. \(1998\)](#) suggested a regional innovation system that defined the region as the spatial scope of innovation by linking the studies related to regional development that had been developed so far and the systematic approach of technological innovation represented by the national innovation system.

In fact, since innovations are cumulative based on interaction, a certain socio-cultural and spatial proximity is required to form an innovation system³). In particular, important knowledge to create innovation is inherently tacit knowledge that is difficult to move beyond a certain space. Therefore, in reality, knowledge or information for

innovation exists within a geographically very limited space, and the interaction or joint learning between innovation actors is also very regionally networked. The role of universities emphasized as producers of knowledge and transmitters and receivers of knowledge are closely related to the traditional research and educational functions of universities.

Meanwhile, another role of universities is to contribute to social development by actively participating in social services or social needs. On the one hand, this means contributing to the development of the local economy by directly applying and utilizing knowledge by converting the knowledge created at the university into economic value. It also means promoting the integration of members of society by forming values and ideologies. It is clear that the role of universities in social service and social participation is not independent of their traditional roles in research and education. The reason is that the creation of knowledge through basic research and applied research and the spread of knowledge, which is represented by nurturing talent through educational activities, ultimately become the basis for social service and social participation, which is another role of the university. In fact, in the triple helix model similar to the regional innovation system, this role of the university is formalized, and spin-off companies are expanded through the knowledge created by the university while participating in venture and commercialization activities using intellectual property rights through technology licensing and patent registration ([Etzkowitz et al., 2000](#); [Huggins et al., 2008](#)).

In other words, the university itself has come to function as a subject that not only produces knowledge but also creates economic value by applying and utilizing it. In fact, as seen in the case of Route 128 in Silicon Valley and Boston, these regions as centers of the revolution were developed as new startups and technology development were actively taking place based on world-class research universities such as Stanford and MIT. In this way, at the very heart of regional innovation, universities can create new knowledge through research activities, spread new knowledge through education, and play various roles that can apply knowledge by providing new entrepreneurship opportunities for university graduates.

The problem is that, while the university paradigm is oriented toward the entrepreneurial paradigm, university research is viewed from an economic point of view related to spin-off too much. The university is a place where such possibilities and capabilities are sufficient. However, it is not desirable to overlook the contribution of universities to social value creation by excessively focusing on economic value creation, especially as an institution that has to create only knowledge suitable for social needs. In terms of application and utilization of knowledge, it is not right to limit the rich potential of universities by simply obsessing over economic

values, and it is necessary to balance the complementarity and balance between the two. This needs to be further emphasized when considering that customs, institutions, cultures, values, and norms rooted in the region are also important for regional innovation.

Local universities play a very pivotal role in the regional innovation system. In other words, it plays the role of an innovation agent that creates new knowledge, and on the other hand, it plays a role in spreading and taking root in the region. In addition, it plays a role in the application and utilization of knowledge by converting new knowledge into economic and social values. In particular, as the university is directly responsible for the application and utilization of knowledge, which was previously handled by companies, and the creation of innovation through this, the university is becoming the center of both the production, diffusion, and utilization of knowledge. More importantly, the university is making a great contribution to building social capital for regional innovation while being closer to local values, culture, and problem-solving in the local community. Therefore, the role that local universities should play in the regional innovation system is their intrinsic role, namely, research, education, social service, and participation.

The mechanism of the regional innovation system that leads to the production, diffusion, and utilization of knowledge through research, education, community service, and participation, which is the university's original role, works effectively. However, different scholars have different opinions on whether universities should focus more on knowledge creation or knowledge diffusion, which we discussed earlier. Even if universities want to increase the commercialization of knowledge, some scholars argue that they should focus on building research capacity (knowledge creation) while developing effective mechanisms for knowledge transfer in both the private and public sectors (knowledge). There are scholars who argue that diffusion) is more important.

More important, however, is an understanding of the diversity of universities and their regions. In particular, it is necessary to accurately grasp the various environmental changes and contexts related to universities and to determine how it is desirable to change the role, structure, and organizational method of universities in the regional innovation system based on this. Also important is the relationship between the path dependence of the regional innovation system and the role of local universities. Since the regional innovation system proceeds as an evolutionary process, it follows a path-dependent process in which the existing national or regional system, environment, and social context affect the next development path.

Therefore, the future path of a region is pre-determined by technological, economic, cultural, political, and socio-historical circumstances. However, this path-dependent process is not fixed, but there is room for development in a more

progressive direction by creating a new path. From the point of view of local universities, what kind of relationship they will form and create a new path in the path-dependent development process of the region is a problem (Zhang, 2016).

Considering this, the recent paradigm shifts in Korea's university paradigm, that is, the environmental change following the university marketization trend provides an opportunity to create a new path under the influence of local path dependence. What is clear is that the role of local universities in this process is highly likely to be different from that of local universities in general discussion. In particular, intensifying competition among universities due to marketization is highly likely to cause bias in the various roles of universities, so appropriate measures are required.

3. Overview of big data analytics for village resources research

3.1. Background and purpose of village resources research

While village projects are spreading nationwide, some are implemented with items that are unrelated to villages or are merely popular and trendy, undermining the projects' self-sufficiency as well as that of the community. In particular, it is important to systematically collect major resources in humanities, urban planning, and architecture and use references to implement projects efficiently in urban regeneration project areas. This study examines the human, physical, historical, and social resources of a village in the local regeneration case of a small regional city in Korea with big data analytics and explores how to connect these with a local university for expertise.

3.2. Scope of big data analytics for village resources research

The analytical scope includes building a database through resources research on Jugyo 1-ri, Yesan-eup, Yesan-gun, and Chungcheongnam-do, conducted from May to August 2020. In particular, 239-1 Jugyo 1-ri includes 237 lots, and an urban regeneration project under the Ministry of Land, Infrastructure, and Transport was linked with a local university. It is critical to apply older local resources from the period of modernization to the current structure over the project period of three years. We suggest how such resources should be utilized through big data analytics with the research expertise of a local university and the highest and best-use approach. The research area includes a total of 237 lots: 216 "potential housing sites" (area: 43,679 m²) accounting for 86.91% and 17 "roads" (area: 6,152.9 m²) accounting for 12.24%. Table 4 shows lot status by type.

First, we conducted a literature review to identify tangible and intangible resources, including the

village's history, economic industries, human resources, and local organizations and compiled all real estate and urban data. Second, photos and drone images were taken for views and facilities to examine the village landscape for the use of major buildings and lands. Third, official registries and local experts were approached to acquire data, which were divided into qualitative and quantitative data types.

3.3. Method of big data analytics for village resources research

To apply big data analytics to village resources research for the Urban Regeneration New Deal Project, it was important to take a value-oriented approach regarding which areas it could actually and specifically benefit. Big data is quite attractive in real estate (Knapp, 2013; WEF, 2012), as it allows a

comprehensive analysis to be conducted that can represent society by quickly and easily collecting a variety of data closely related to daily life (Rizk, 2018; Li et al., 2020).

The value of big data in real estate is to predict real estate phenomena in the future more accurately (Bryant et al., 2008; Yiu, 2012; Chau et al., 2002; Iacovou et al., 1995). It can identify interactions and causality between sectors by analyzing various sources of data that have been continuously accumulated across a wide range of phenomena related to real estate (Fenn and LeHong, 2011). These accumulated data can help identify the ripple effect and causality of real estate policies and market changes, detect current trends based on real-time data, and predict the future more accurately. Under this assumption, we suggest several options for the application of big data to local resources research.

Table 4: Lot status by type

Type of lot	Number of lots	Area(m ²)	Percentage (%)	Remarks
Potential housing site	216	43,679.0	86.91	
Rice paddy	1	255.0	0.51	236-15
Field	2	66.0	0.13	239-7, 248-21
Stream	2	106.3	0.21	
Road	17	6,152.9	12.24	
Total	237	50,259.2	100.00	

First, big data can improve policy reliability and transparency in a complex policymaking process through quantifiable and measurable analysis and make it possible to deliver predictable public consensus-based policies in real estate (Amankwah-Amoah and Adomako, 2019; McAfee et al., 2012). It allows us to identify and communicate people's needs for urban regeneration project policies and seek public consensus-based policies that reflect public feedback and sentiment about policies. During the policy identification process, sentiment analysis can be conducted by collecting social data about public opinions with keywords related to land policies or real estate markets (Miles, 2008; Sukumar and Ferrell, 2013; LaValle et al., 2011), which helps gather an understanding of the national land market and identify public sentiment, preemptively discover policy tasks, and monitor the practicality of policies in real-time during policy implementation.

Furthermore, sentiment analysis can be used to understand public opinions and determine why certain policies are received positively or negatively in policymaking and the implementation of urban regeneration projects (Hasan et al., 2020; Coble et al., 2018). Additionally, it is possible to analyze related words in policy details and monitor which issues are relevant. During the policy evaluation process, it would be feasible to discover idle public-sector resources in villages and information about how to utilize these resources to evaluate whether policies work in an intended manner.

4. Results of research on village resources connected with the local university

4.1. Status of village resources

While it does not have large-scale apartment complexes, the village contains many households and individuals and is located at the center of the commercial area in front of the train station with natural elements around it. It used to include five districts in Jugyo-ri across Yesan Bridge before August 1996, but the districts were separated from today's village. Geographically, there are Yesan-gun Office east of Yesan-gun and Kongju National University southeast. Key transport facilities include Yesan Terminal and Yesan Station (Janghang Line), and Muhan-Cheon Sports Park is near Muhan-Cheon, west of Jugyo 1-ri. Furthermore, five national highways and seven regional highways pass through Yesan-gun with 13 gun roads for transportation in this area. There is one Janghang Line connecting Cheonan and Janghang and three train stations (Yesan Station, Sillyewon Station, Sapgyo Station), the inter-regional Seohaean Expressway 30 km west of Yesan-eup, and Dangjin-Daejeon Expressway, which opened in 2009 and passes through Yesan-gun. The results of field research indicated that the village has a total of fifty-five industrial buildings: retailers (18), followed by offices (16) and restaurants (11). Fig. 1 shows the framework for using big data in regional resources research and Table 5 shows the types of industrial facilities in the village.

4.2. Linkage with major buildings

Fig. 1 provides a comprehensive map of village tourism and transport resources in connection with the urban regeneration project. It is possible to plan a route that starts from Yesan Station, Yesan-gun, and Chungcheongnam-do, then goes through houses, Nonghyup’s warehouse, Donghoon Inn, Muhan-Cheon, and returns passing through a rice mill and houses and reaches Yesan Jungang Elementary School. In particular, we suggest remodeling Nonghyup’s warehouse in Block 3 into Ieum Creation Center. Despite the local characteristics of

neighborhood housing around the elementary school, the village has no facility for adolescents and children, and it is, therefore, necessary to utilize empty or abandoned houses to implement a for-profit community project. This can be used as a tourism experience space by opening, sharing, and connecting urban public facilities through organic integration, providing integrated services, and raising awareness about the space. In particular, it is possible to establish a place for creative activities (woodworking), experience, and education. Fig. 2 provides the background of this concept.

Table 5: Types of industrial facilities in the village

Type	Number of buildings	Percentage (%)	Remarks
Retailer	18	32.73%	Beauty salon, cafe, butcher shop, laundry, flower shop, sporting goods store, photo studio, etc.
Wholesaler	1	1.82%	Rainbow Egg
Broadcasting station	1	1.82%	Jeung San Do
Hospital	4	7.27%	Yesan Jeil Dental Clinic, Jeil Clinic, Yesan Animal Hospital, Saemaul Livestock Hospital
Office	16	29.09%	Cheongam Construction, Nonghyup, Geummaek EandC, Daseung Construction, Sungwon Construction, Kia Motors, etc.
Restaurant	11	20.00%	Gyeongil’s, Yewon, Dongwoohoe, Seohaejimul, Oraedoenmiraega, Sageori Bunsik, etc.
Inn	1	1.82%	Donghoon Inn
Hardware store	2	3.64%	Sinil Hardware, Daeheung Hardware Tools
Hagwon (Korean cram school)	1	1.82%	Deungyongmun Hagwon
Total	55	100.00%	

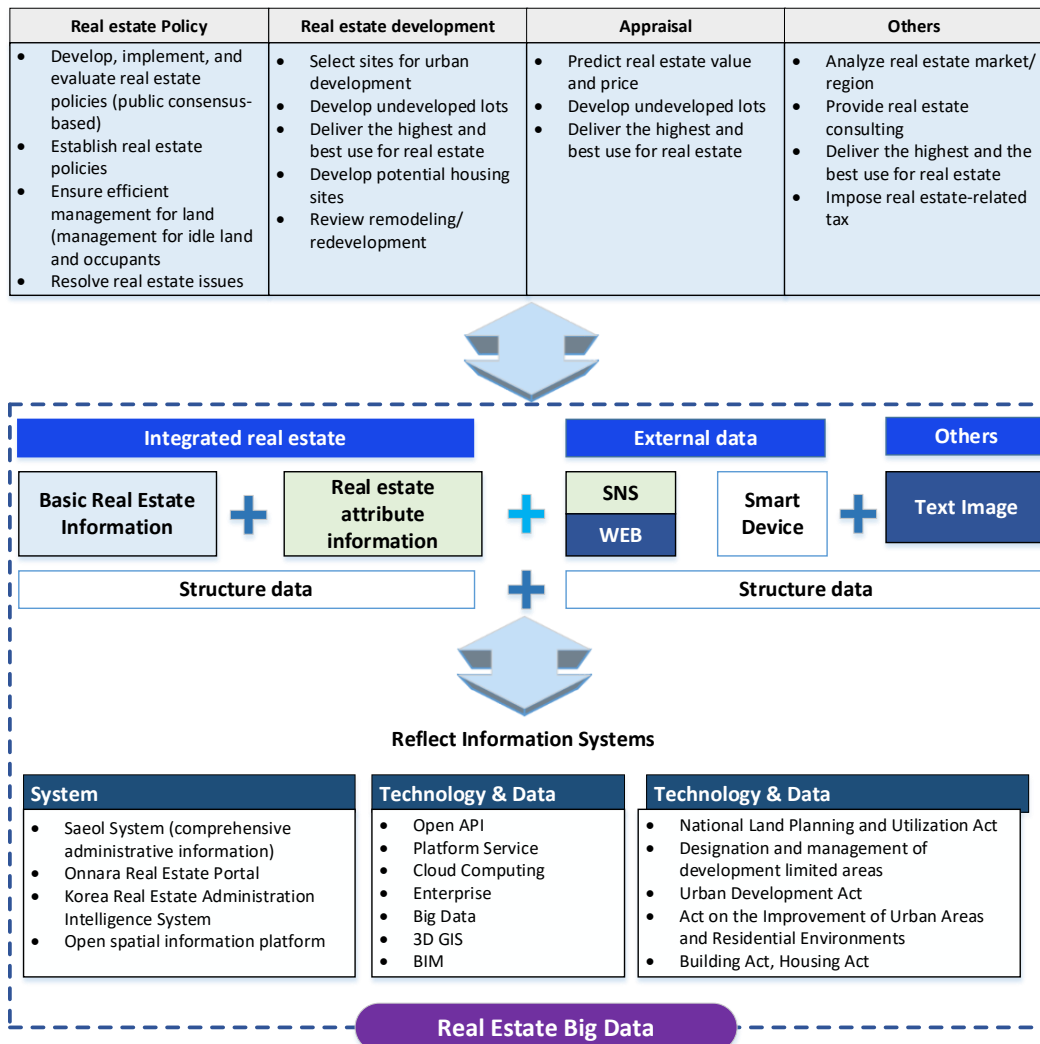


Fig. 1: Framework for using big data in regional resources research

5. Conclusion

5.1. Discussion of the results

This study used big data to identify local-level resources and the status of the local area for the regeneration of a small-scale village and applied it to the case area in the real estate big data system, which was divided into real estate policy, development, appraisal, and local analysis. In particular, we provided a specific case of how to connect with a local university for the expertise and

solve local issues. We used big data analytics and reviewed how to research and utilize idle local resources in connection with a local university in an information communications technology-based urban regeneration project. We discussed the utilization of an abandoned warehouse in the local area and the generation of profits through cultural activities. First, this can create jobs for the village based on woodworking. Further, it can be linked with clubs in the local university and young people's startups.

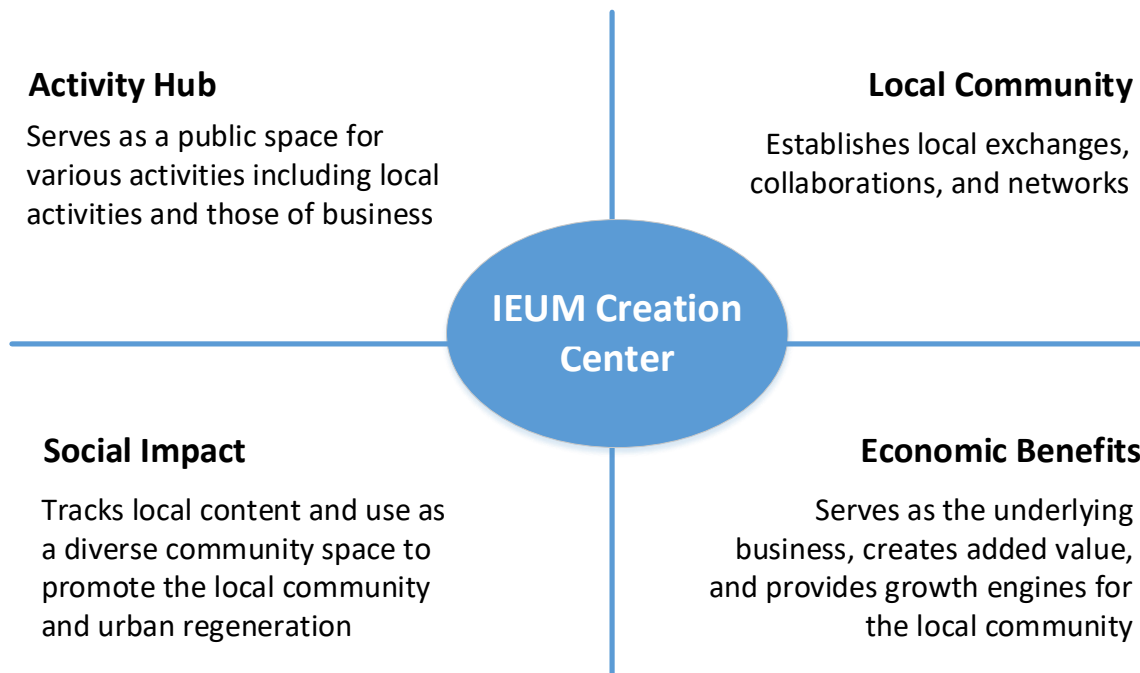


Fig. 2: Directions of Ieum Creation Center

Quantitatively, offices and physical stores can be designed to sell the products, and quantitatively, it can increase business for potential social enterprises based on national land transport and expand local governance along with company growth and local exchanges. Second, in terms of providing new and educational information, the Chungnam Appropriate Technology Federation, a local non-profit organization, can be used as a place of education and practice, encouraging the growth of a collaborative organization through continued product development. This is because it can expand the base of appropriate technology and strengthen the local collaboration system. Third, it can attract people from elsewhere. As the Atelier Non-Electric Project is promoted more widely with a higher level of awareness, it can systemically establish a process of training self-sufficient young people, attract graduates from other local universities to obtain jobs in this area, and subsequently create a virtuous cycle. As can be seen from the summary so far, the creative office mentioned the usefulness of the village resource survey by approaching it from four dimensions: The activity area, the role of the local community, and the social role and economic effect. Rather than demolishing the reference to the old

village with a long history of more than 100 years, through internal remodeling that utilizes the old framework without structural change, the villagers, interested groups, and local governments and universities can inspire local culture and history together through cooperative ideas. The design strength of possible thematic elements could be presented analytically. In addition, it was possible to provide policy implications based on priorities such as the maintenance of old houses and alleys requiring maintenance through big data analysis of neighboring areas of the project site. This could show that big data analysis can be used as an alternative tool that can efficiently use resources and alleviate conflicts of interest among residents by prioritizing bottom-up resident-led projects with limited resources.

5.2. Findings of the research

This study used big data analytics to analyze the status of a local area and reviewed how to solve its issues by implementing the Urban Regeneration New Deal Project in connection with a local university. Notably, our research is significant as a case study that has reviewed the right directions for the project

by examining practical guidelines to discover village resources, the relationship between the local university and community, and the programs and physical facilities that can be linked to the project. In other words, if this study is summarized, big data analysis can be used to discover resources and to investigate the current situation at the regional level, which should be done in advance in order to carry out small-scale village regeneration in the urban regeneration project based on Information Communication Technology. This study focused on methods and considerations for bottom-up problem solving by linking expertise with local universities along with local issues by using big data analysis. In addition, for this demonstration proposal, the role and method were analyzed through the local government's project site, and through this, an example of how big data could be utilized for scientific analysis in future research on local resources at local universities was presented. However, as a limitation of this study, it has not been clearly identified as to the scope for universal application in urban and village regeneration units in big data analysis and utilization. Also, since it is a study proposed through cases, more cases are required to lead to a discussion of generalization. Nevertheless, it is judged to be different from previous studies in that it suggested the possibility and role of big data analysis in the investigation of local universities and local resources.

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Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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