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A Study on the Changes in the Appraisal Industry in the Era of the 4th Industrial Revolution - Focus on the Factors Affecting Intention to Adopt Big Data in the Appraisal Field

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Abstract

The appraisal industry is the first structural change since the public land price system was implemented in 1989. Since the environment surrounding the appraisal market has changed so far, structural adjustment from the inside is inevitable, even though it was not enforced through legislation. This study aimed to identify factors that affect the intention to adopt big data in the appraisal field based on the perception of values and environmental factors suggested by Paret et al., Quinn & Baily, Elizabeth & Michael, and Kyung, and propose a relevant guideline to institutions and corporations that consider adopting Big Data. Based on empirical analysis using SEM (structure equation modeling), the result was as follows: first, institutions and corporations considering adopting big data in the appraisal field should focus on improving the work process, capturing opportunities, and providing information for decision-making. Second, they must thoroughly review internal factors of the Appraisal industry, such as IT development trends and changing environment, and select crucial business partnerships to gain competitiveness in the market.

Keywords: *4th industrial revolution, Real estate appraisal, Big data, Real estate industry, Internet of things*

1. Introduction

Professor Jerry Kaplan of Stanford University, an expert in artificial intelligence, said, "The development of AI will destroy most of the current human work." “We cannot avoid mass unemployment” [7]. The Korea Employment Information Service analyzed the job replacement probability among the 400 significant occupations in Korea through artificial intelligence and robot technology.

This situation is no exception in the appraisal industry. The environment surrounding the appraisal market has changed so far. Even if it was not enforced through law enactment, structural adjustment from the inside is inevitable. I want to suggest from the perspective that the arrival of the fourth era of the Industrial Revolution is a new opportunity, not a crisis, in

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terms of seeking a new direction in the appraisal industry, which is faced with the change of the internal and external situation.

2. Literature review

2.1. Significance of big data

Various researchers have defined big data. Newman describes the characteristics of big data as volume, diversity, and so on, which is beyond the capacity that conventional database systems cannot handle [5]. IBM defines Big Data Technology as meeting two or more of these 3V factors. Big data's biggest feature is its non-uniformity, such as video and image. Big data has a large data size and various types of data [3]. Data processing and analysis have to be resolved on time. As a result, you need to be able to create new value. It is defined as requiring timeliness, such as real-time processing in analysis and forecasting, including both formal and unstructured data such as corporate information, web, image/video, SNS, sensor stream, etc., beyond the limit of storage, management, and analysis.

2.2. Status of big data

The domestic big data market is expected to grow by discovering big data services in various fields, such as real estate, transportation, and education. Korea Information Technology Agency (2013) expects the domestic big data market to reach about $ 263 million in 2015, accounting for about 1.6% of the global market and about $ 900 million in 2020. While Big Data is attracting attention with its huge data size, as its name implies, the most challenging aspect is that there are a lot of deficiencies in structuring the data. Most big data is unstructured data such as posts, videos, photos, and music that cannot be easily cataloged.

2.3. Application of big data

For a company to adapt to the big data era, the first thing is to be armed with a mind to do data analytical management. Data analytics management means solving business problems based on data analysis. Second, companies must innovate by digitizing their businesses to gain a competitive advantage in the big data era.

Harim grows 200 million chickens a year in 530 direct farms and contract farms. The chickens on the farm are kept for 30 days and put in a truck simultaneously. However, since the 2000s, demand has become more demanding, and weighing conditions have begun. For example, a school food service company required more than 1.7 kilograms and a franchise company required 1.5 to 1.6 kilograms. If you do not meet or exceed this weight standard, you will have to sell the chicken after it has been dismantled. Therefore, the precise weight prediction of the chickens in breeding became very important, and Harim introduced the Internet of Things to the demonstration farm. ‘501 Poultry Farm’ is a direct farm of Harim, raising 1 million a year in 5 farms. The farm includes infrared CCTV tracking the movements of chickens, sensors that weigh in at intervals of 1 / 10th of a second when the chicken is struck, and sensors that measure temperature, humidity, benzene, toluene, and dust; the transmitting wireless communication equipment is installed. In this way, the Central Analysis Center has accumulated 864,000 daily data and analyzed them to accurately predict the weight gain of chickens, weight distribution, and the average weight in 10-gram units.

2.4. Public sector big data

In Korea, we sought ways to implement smart government using big data in 2011. On the other hand, the "Public Data Provision and Use Revitalization Act" was enacted in July 2013, laying the foundation for institutional devices related to support and utilization of big data [1][6].

According to the national spatial information policy, the Ministry of Land, Transport, and Maritime Affairs (2014) implemented 385 spatial information projects 2014. In detail, there are spatial information fusion and complex businesses, indoor spatial information businesses, unification of real estate administration information and spreading spatial information utilization businesses, and space information foundation businesses.

Meanwhile, to build a spatial data system, database construction, and analysis model for population, income, weather information, real estate price, SNS, and search information, which is administrative information, In the "Public Data Portal (www.data.go.kr)," which is operated by the Ministry of Government Administration and Home Affairs (MOCIE) entrusted to the Korea Information Science Promotion Agency, more than 14,000 data from over 700 public institutions are provided.

3. Research design

3.1. Research model

This study was designed to identify the factors that impact big data on strategic value recognition [2][4][5]. Based on this study, we selected products and services, management productivity, decision support, and environmental factors as independent variables considering the characteristics of the appraisal industry. The intention of introducing big data in the real estate field was selected as a dependent variable, and the research model was formed in Figure 1.

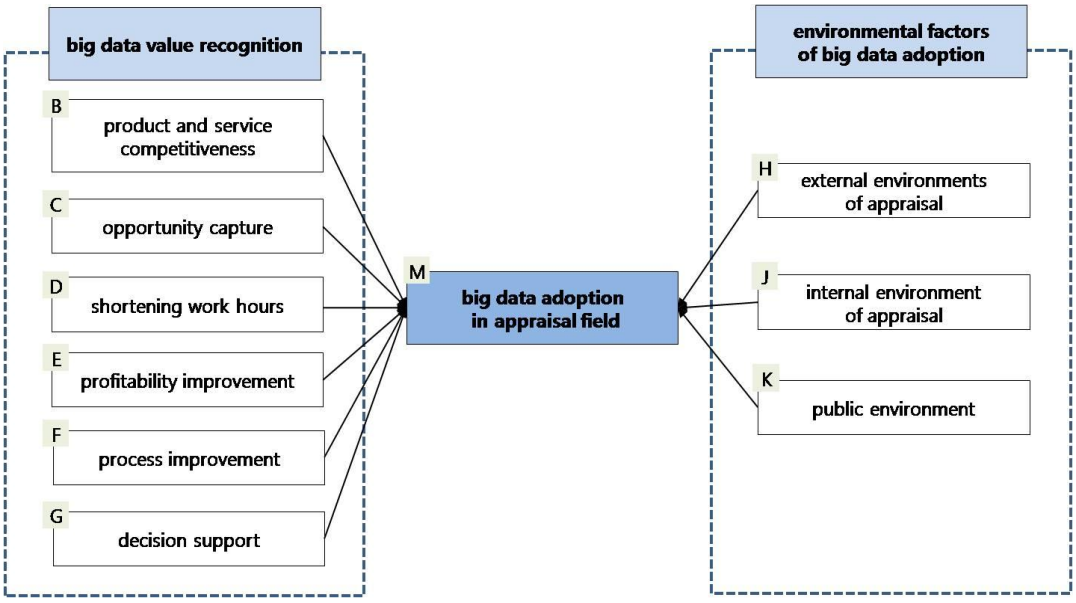

Figure1. Research model design

3.2. Measurement items of independent variables

In the study, variables and detailed measurement items were selected and measured on a scale of 5 points.

Table 1. Independent variable's measurement items

variable	measurement item	
product and service competitiveness (B)	B1	Customized and intelligent products and services can be provided.
	B2	It helps improve processes for companies to provide products and services.
	B3	Improve real-time coping and support capabilities for customer's product and service requirements.
	B4	Improve real-time coping skills with product and service risk factors.
opportunity capture (C)	C1	Improves the ability to capture opportunities to improve business processes.
	C2	Improves the ability to capture opportunities to improve products and services.
	C3	Improves ability to capture new and new service development opportunities.
	C4	Improves ability to capture new business opportunities between businesses.
shortening work hours (D)	D1	It can shorten product and service production/distribution time.
	D2	The time spent responding to customer claims and requirements can be shortened.
	D3	It can shorten the analysis and forecasting time for changes in the company's internal and external environment.
	D4	You can shorten the decision-making time of managers and managers.
	D5	It can shorten the development period for new services.
	D6	It can shorten the development of new business models and the convergence period with other fields.
profitability improvement (E)	E1	It can improve sales.
	E2	It can improve market share.
	E3	It can improve customer satisfaction.
	E4	It can improve returns
process improvement (F)	F1	You can improve the process of providing services.
	F2	You can improve the forecasting process.
	F3	Improve the decision-making process of managers and managers.
	F4	Improve the new service development process.
	F5	Improve new and new business development processes.
decision support (G)	G1	Effectively support decision-making for issues and risk responses.
	G2	It can provide various decision-making information based on social phenomena and accurate data.
	G3	Various analyses and predictions are available for decision-making.

3.3. Reliability and feasibility verification

The measurement variables were analyzed to extract the constituent factors through the scale refinement process, and the direct method was adopted to simplify the factorial materialization. The selection criteria for the available measurement items in this study were 1.0 or more for the unique value and 0.4 or more for the factor load.

As a result of the factor analysis of the independent variables, 18 items were finally adopted by removing the seven measurement items loaded by the theoretical structure.

Table 2. Factor analysis result

구분	Component						Cronbach α
	F	E	D	G	B	C	
F3	.808	.195	.063	.217	.064	.135	0.902
F4	.765	.231	.125	.172	.265	.194	
F5	.762	.329	.195	.156	.225	.085	
F2	.672	.130	.268	.212	.161	.252	
F1	.642	.174	.292	.165	.415	.125	
E2	.105	.891	.089	.076	.191	.084	0.899
E1	.172	.855	.107	.171	.175	.071	
E4	.318	.781	.215	.191	.023	.065	
E3	.319	.691	.294	.171	.081	.214	
D1	.155	.115	.813	.184	.135	.510	0.815
D2	.245	.213	.739	.125	.275	.105	
D3	.154	.398	.624	.281	.061	.331	
G3	.195	.202	.131	.813	.215	.191	0.87
G1	.425	.164	.259	.681	.151	.105	
B3	.272	.129	.133	.237	.827	.201	0.898
B4	.301	.176	.272	.184	.770	.255	
C1	.313	.101	.091	.121	.215	.828	0.733
C4	.187	.242	.284	.255	.315	.638	

3.4. The effect of big data value recognition on the adoption

As a result of the multi-regression analysis, Table 3 was derived, assuming that there is a linear function relationship between the value recognition of big data and the adoption.

Table 3. The regression analysis of big data values recognition and adoption

dependent variable	independent variable	non standardization coefficient		Standardization coefficient	t	significant probability	conjugate statistic	
		B	standard error	beta			tolerance limit	VIF
big data adoption in the appraisal field	(constant)	1.235	0.551		1.954	0.053		
	process improvement	0.583	0.225	0.397	2.788	0.005	0.361	2.879
	profitability improvement	-0.168	0.145	-0.134	-1.049	0.285	0.485	1.955
	shortening work hours	0.358	0.185	0.251	1.865	0.068	0.445	2.331
	opportunity capture	0.481	0.195	0.353	2.451	0.015	0.465	2.152
	product and service competitiveness	-0.103	0.161	-0.085	-0.658	0.552	0.451	2.225
	decision support	0.357	0.17	0.131	1.998	0.042	0.414	2.312

As a result of verifying the association between independent variables, the VIF of all variables was less than 10, and there were no multiple conjugates.

The regression analysis results showed 52.5% of the explanatory power, as shown in Table 3, which was statistically significant.

4. Conclusion

The study results show that changes in the perception of big data have affected the valuation agency's perception of value for big data. In other words, introducing big data in the appraisal field can improve the business performance process, and big data will capture opportunities such as finding new businesses. This suggests that big data can produce different analysis results using various external and internal data, thus enabling diverse and intelligent services to customers (the public) and improving risk and crisis management capabilities to enhance external competitiveness.

Big data is still an early stage in the appraisal field, but it is the best technology to solve all the problems efficiently. Therefore, big data should be used in the appraisal field, which is the current pilot test level and should be more active in public, business, and academia.

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