Relationship between Business Type on Sales Orders and Major Factors in Domestic Ecommerce Markets*

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Abstract

Purpose: The goal of this study is to comprehensively grasp the current status of ecommerce and to use as basic data for information-related policies. In this work, we understand recent ecommerce utilization, purchasing business by main factors, and look over the association between business type on sales orders (BTSO) and three variables: region, occupation and group type. **Research design, data and methodology:** The resource of this research is obtained by Ministry of Science and Technology Information and Communication in 2017, and investigated about 14,000 national business samples. Two statistical methods are used to analyze the association between the three variables: chi-square test and correspondence analysis. **Results:** The findings show that BTSO is pairwise associated with thee categorical variables, and the association between the categories of the two variables can be visually examined on two dimensional plane. **Conclusions:** This study suggests 'household & individual consumers' among BTSO are closely connected with 'Chungbuk' and 'Kyungnam' for region, 'others', 'finance & insurance' and 'association, repairing & other personal service' for occupation, and 'national & local government' for group type. Additionally, 'other companies' among BTSO are, particularly, related to 'Chunnam' for region, 'manufacturing industry' for occupation, and 'company corporations' for group type.

Keywords : Association, Business Types on Sales Orders, Ecommerce

JEL Classification Code : C40, M12, M30, Y10

1. Introduction

According to the Korea Internet & Security Agency (KISA), the domestic online shopping market is expected to reach 80 trillion won by 2019, reaching 190 trillion won by 2022. In particular, large corporations that have launched their online shopping market last year have expanded their business in earnest, while offline channels such as large marts have been sluggish and interest in the online

shopping industry has increased relatively. In 2020, traditional offline retailers and ecommerce companies are expected to face a battle over the online shopping market. In addition, competition is expected to become more intense as

there is a consensus among companies that more customers should be preoccupied at a cheaper price than competitors.

According to the National Statistical Office, domestic early morning delivery has grown rapidly from 10 billion won in 2015 to 400 billion won in 2018, and industry officials expect to exceed 1 trillion won by 2019. As such, 'one-day delivery' has become one of the major online shopping patterns of domestic consumers.

As the number of households reached 6 million, there was a change in the online shopping popular product category. In the case of single-person households, the trend of convenient and inexpensive online shopping is higher than shopping through large marts, so the domestic alternative food category of online shopping is naturally growing.

In this study, several associations between business type on sales orders and three different factors such as region, occupation and group type are examined by computing the chi-squared test and the correspondence analysis. Three levels of business type on sales orders mentioned above are as follows: 'other companies', 'government & public institutions', and 'household & individual consumers'.

In section 3, data collection and statistical techniques will be briefly mentioned. Relationships between three main variables and business types on sales orders will be shown as p-value of chi-squared test, along with a bi-plot in section 4. Finally, conclusion remarks and imitations of this study will be stated in section 5.

2. Literature Review

Vin & Chun (2019) considered ways to secure the best trade competitiveness of members in the ecommerce market, by examining Amazon's case of securing trade competitiveness by introducing new logistics system and idle resource usage. Domestic ecommerce companies also utilize the infrastructure and distribution logistics conditions currently owned from the viewpoint of providing new benefits to stakeholders and the trade information and communication technology (ICT) capabilities. If ecommerce trade volume increases, new logistics innovation should be led by combining smart logistics that combines various IT technologies with logistics such as transshipment logistics demand, transportation, storage, and unloading.

Kang & Chun (2018) aimed to draw implications from economics and institutional analysis on recent ecommerce issues in non-market and market areas from an integrated strategy perspective. The key to the integration strategy is to solve the problems of stakeholders participating in ecosystems and platforms and create common value by providing technologies and solutions to stakeholders. They insisted that domestic IT companies and online commerce platforms should design an economy to increase the benefits of flat home sellers and holders, to grow the entire ecosystem, and to share values to all other stakeholders. Furthermore, companies that run online commerce flat homes should strive in the long term to open up a large portion of their organization and work. Specifically, platform operators can provide information and consulting to upgrade the solutions listed by developers by identifying regulations, monitoring or trading conditions.

Kim et al (2017) examined the cases of domestic companies entering the Chinese B2C ecommerce market according to the Korea-China FTA and suggested the ways to revitalize ecommerce. As a result of the analysis, it was found that, because of the change of the trade environment and the development of the internet, there exist the opportunity and threat factors to Korean companies entering

the Chinese market at the same time. In order to activate ecommerce, it is judged that a thorough customized localization strategy, web promotion strategy, logistics and distribution system and e-customization strategy, security certification and payment system strategy are necessary. In the government side, it is necessary to raise unfairness, improve insufficient laws, strengthen export support system, and establish ecommerce claims and arbitration system.

Jeong & Wang (2016) applied two types of cluster analysis based on the three types of ecommerce development and attributes mentioned in the ecommerce development index (EDI). In addition, using multidimensional scale, they compared each of 50 major cities and examined what image attributes they have. As a result, 50 major cities were clearly classified into four clusters, and Shenzhen, together with Guangzhou and Hangzhou, was found to have the advantage of all three evaluation attributes: internet merchant index, internet shopping index, and ecommerce development index.

Jeong (2015) classified and positioned the 16 administrative districts and 13 industries in South Korea into the groups with similar attributes in terms of the ecommerce purchase motives. As a result, wholesale and retail, manufacturing, Seoul and Kyunggi showed the advantage in terms of purchasing process simplicity, purchasing cost reduction, and ease of contact with suppliers, and Jeju was inferior. On the other hand, wholesale and retail business, lodging food business, while Daegu and Kyunggi are inferior, while group repair and personal service business, Chungbuk and Kyungnam are superior, in terms of the improvement variables of the speed of work.

3. Data Collection and Statistical techniques

Ministry of Science and Technology Information and Communication investigated about 14,000 national business samples in 2017 (January, 2017~December, 2017), which was one or more workers in the whole country. That is, it refers to individual units of business, whether commercial or non-profit, engaged in industrial activities, such as producing, selling, or providing services, under a single ownership or control, in a single physical place.

The purpose of this work is to comprehensively grasp the current status of information of all Korean businesses including public and private, to use as basic data for information-related policies and to provide international data.

In this study, ecommerce means how a product or sale is made online through computers and networks (including mobile commerce). In this case, ecommerce includes internet-based mobile phones, such as mobile commerce, but does not include the ordering or receiving of products or services using telephones, faxes, or conventional email. In the case of the financial insurance business, ecommerce, in

particular, refers to a method of purchasing goods or services through an internet-based network or selling goods, information and services through an internet marketplace (a website capable of internet banking service). Ecommerce targets include information services such as raw materials, foodstuffs, parts, office supplies, devices, maintenance supplies, reports and software, and services such as online finance, accommodation, transportation and air travel.

In order to detect an association between two nonmetric variables, two main statistical techniques given below will be used. Chi-squared test can be used as a statistical tool to test the association between two categorical variables and there is an evidence that a significant association between two variables exist if the computed p-value is small (Agresti, 2002).

Once a significant association between two variables exists, this association can be shown as a graphical display, in which all rows and columns are depicted as a point. We can figure out easily visual degree of associations by measuring the distance between categories of the corresponding variables (Greenacre, 1984; Hoffman & Franke, 1986; Clausen, 1988; Benzercri, 1992; Greenacre, 2007; Hair et al., 2007; Brigitte, 2009; Steven, 2009; Doey & Kurta, 2011; Yang, 2013).

4. Research Results

4.1. Ecommerce utilization by three factors

Ecommerce business refers to one with experience in purchasing (ordering) or selling (ordering) products or services through ecommerce among all businesses January to December 2017. In this survey, a business entity is an individual management unit that engages in industrial activities, such as producing, selling, or providing services, under a single ownership or control, in any physical place, whether profitable or nonprofit.
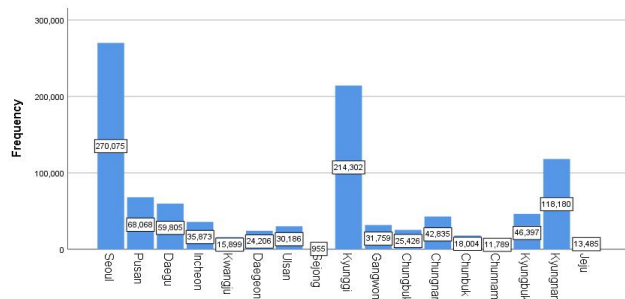

Figure 1: Ecommerce usage by region

By region, ecommerce usage rate is high in the order of 'Seoul' (26.3%), 'Kyunggi (20.9%)', 'Kyungnam' (11.5%),

'Pusan' (6.6%), 'Daegu' (5.8%), 'Kyungbuk' (4.5%), 'Chungnam' (4.2%), 'Incheon' (3.5%), 'Gangwon' (3.1%) and 'Ulsan' (2.9%), and so on. On the other hand, Sejong (0.1%), 'Chunnam' (1.1%), 'Jeju' (1.3%), and 'Kwangju' (1.5%) were relatively low. This reflects the fact that ecommerce utilization is high in areas with large populations (see Figure 1).
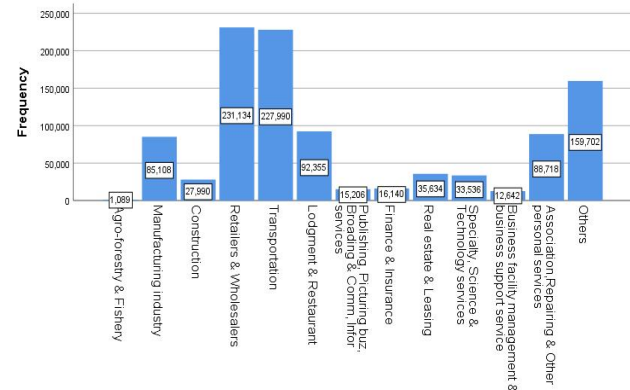

Figure 2: Ecommerce usage by occupation

The ecommerce utilization rate by industry is relatively high in 'retail & wholesalers' (22.5%), 'transportation' (22.2%), 'others' (15.5%), 'lodgment & restaurant business' (9.0%), 'association, repairing & other personal service' (8.6%), and 'manufacturing industry' (8.3%), while 'agro-forestry & fishery' (0.1%), 'business facility management & business support service' (1.2%), 'publishing, picturing biz', 'broadcasting & communication, information service' (1.5%), and 'finance & insurance' (1.6%) account for relatively low proportion (see Figure 2).
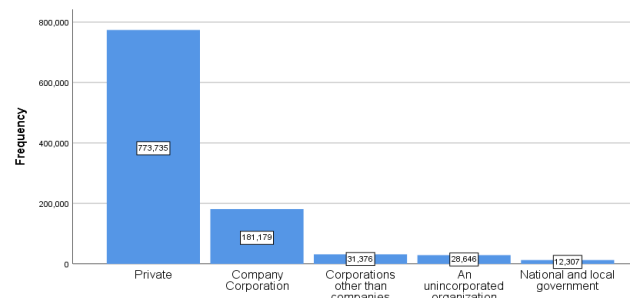

Figure 3: Ecommerce usage by group type

By organization type, 'private businesses' (75.3%) and 'company corporations' (17.6%) account for a much higher percentage, while relatively 'corporations other than companies' (3.1%), 'unincorporated organizations' (2.8%), and 'national & local governments' (1.2%) have relatively low utilization rates. 'Private businesses' and 'company

corporations' account for 93% of the total utilization rate from Figure 3.

4.2. Purchasing business by three factors

Purchasing includes all capital, including raw materials, foodstuffs, parts, office supplies, appliances, maintenance supplies, information services such as reports and software, and services such as online finance, accommodation, transportation and air travel.
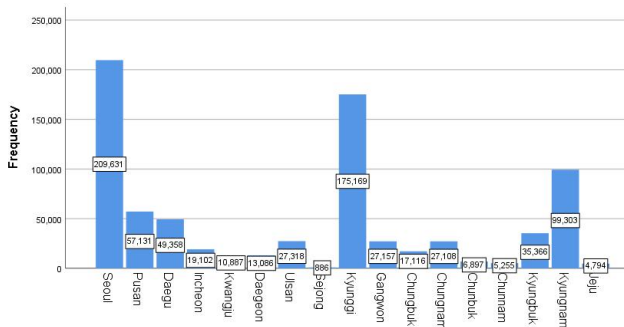

Figure 4: Purchasing businesses by region

By region, ecommerce purchasing rate is high in the order of 'Seoul' (26.7%), 'Kyunggi' (22.3%), 'Kyungnam' (12.6%), 'Pusan' (7.3%), 'Daegu' (6.3%) and 'Kyungbuk' (4.5%). On the other hand, 'Sejong' (0.1%), 'Jeju' (0.6%), 'Chunnam' (0.7%), and 'Chunbuk' (0.9%) are relatively low (see Figure 4). This shows that there is no big difference from ecommerce utilization rate.
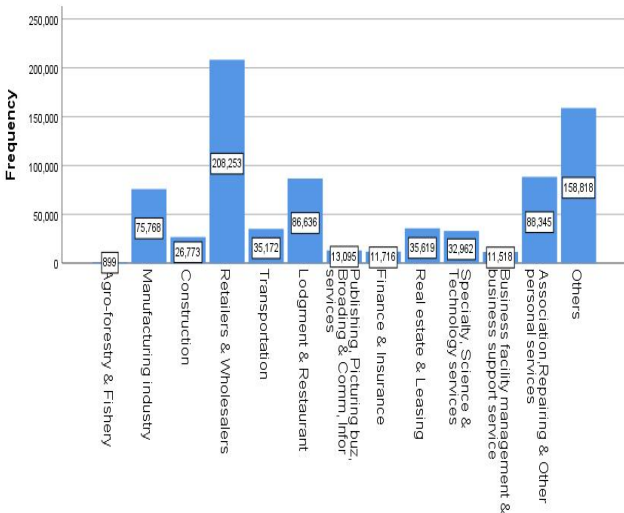

Figure 5: Purchasing businesses by occupation

According to the ecommerce purchasing rate by industry, 'retail & wholesaler' (26.5%), 'others' (20.2%), 'association, repairing & other personal service' (11.2%), 'lodgment &

restaurant' (11.0%), and 'manufacturing industry' (9.6%) account for relatively high percentage. On the other hand, 'agro-forestry & fishery' (0.1%), 'business facility management & business support service' (1.5%), 'finance & insurance' (1.5%), 'publishing, picturing biz, broadcasting & communication information service' (1.7%) explain relatively low proportion (see Figure 5).
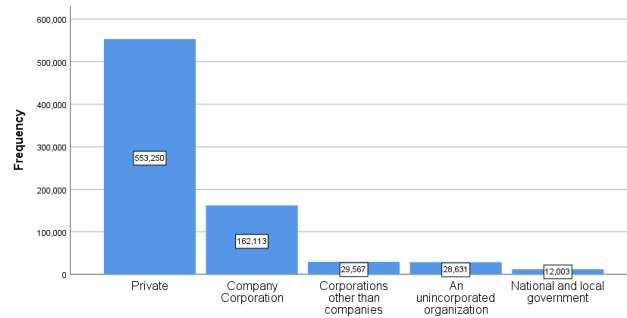

Figure 6: Purchasing businesses by group type

By group type, the purchase rate of 'private businesses' (70.4%) and 'company corporations' (20.6%) account for a very high percentage, while relatively, 'corporations other than companies' (3.8%), 'unincorporate organizations' (3.6%), and 'national & local governments' (1.5%) have relatively low utilization rates. 'Private businesses' and 'company corporations' account for 91% of the total purchase rate (see Figure 6).

4.3. Association between Region and Business types on sales orders

If we examine the proportion of ecommerce sales among ecommerce businesses that sell products and services through ecommerce, we can find that in all regions, 'household & individual consumers' account for a much larger portion, and 'government & public institutions' explain a very small portion.
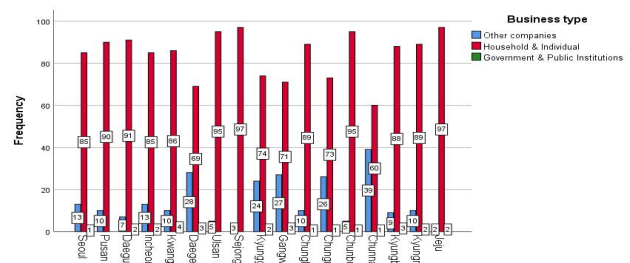

**Figure 7:** Business type by region

In particular, this phenomenon is prominent in 'Sejong' and 'Ulsan', while in 'Daejeon' and 'Gangwon', the proportion of 'government & public institutions' is relatively large in terms of the proportion of ecommerce sales (see Figure 7).

There exists a significant association between region and business type on sales orders (p-value < .001). The first and second dimension explain 92.0% and 8.0%, respectively of the total 9.6% of variance accounted for in the model (see Table 1).

Table 1: Summary on region

Dim.	Singular Value	Inertia	Chi Square	P-value	Proportion of Inertia		Confidence Singular Value	
					Account.	Cumul.	Std. Dev.	Correl. 2
1	.298	.089			.920	.920	.025	.013
2	.088	.008			.080	1.000	.026	
Total		.096	163.75	<.001	1.000	1.000		

A bi-plot on Figure 8 exhibits visual associations of each category of between region and business type on sales orders by measuring the distance between categories. From Figure 8, 'household & individual consumers' among regions are marginally connected with both 'Chungbuk' and 'Kyungnam'. In addition, 'Chunnam' and 'other companies' are closely connected to each other.
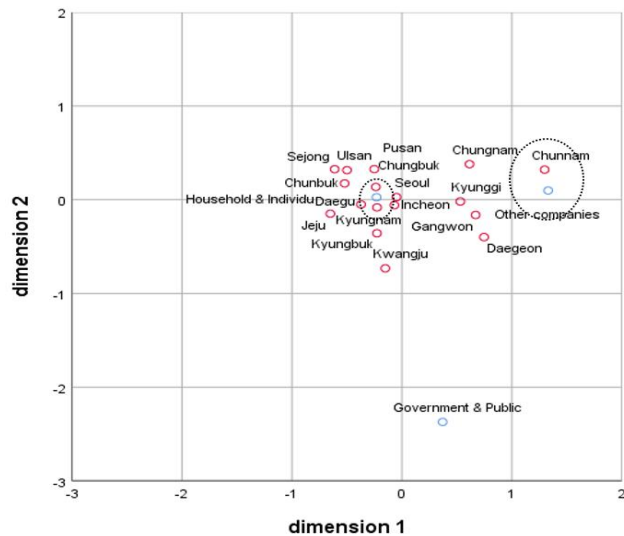

Figure 8: Row and column points with symmetric normalization

4.4. Association between Occupation and Business type on sales orders

If we consider the proportion of ecommerce sales by occupation from Figure 9, 'household & individual consumers' have absolute superiority in most occupations except for 'manufacturing industry' (44%), 'construction' (18%) and 'specialty, science & technology services' (20%). This aspect is prominent in 'real estate & leasing' (99%),

'transportation' (98%), and 'lodging & restaurant business' (96%).
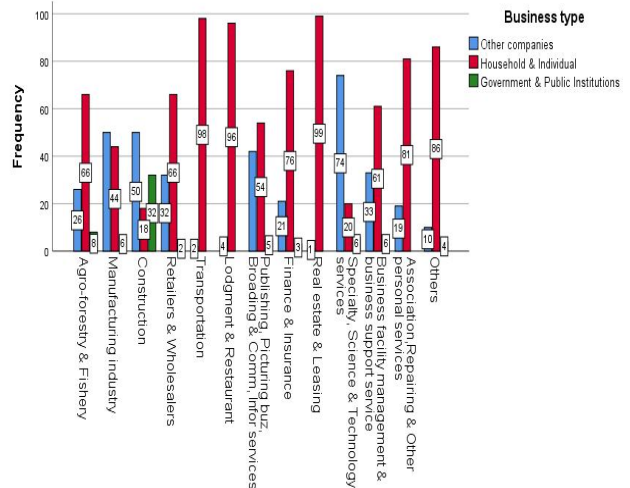
Figure 9: Business types by occupation

Especially, what should be noted is that among business type on sales orders, 'other companies' account for the largest portion in 'specialty, science & technology services' (74%), 'manufacturing industry' (50%), and 'construction' (50%), while 'government & public institutions' account for a large share of the 'construction' (32%) compared to other occupations.

The finding of chi-squared test means the close association between occupation and business type on sales orders (p-value <.001), and the first dimension explains 81.42%, and the second does 18.6% of 38.0% of variance accounted for in the model (see Table 2).

We can find that both 'other companies' and 'government & public institutions' are closely related to 'manufacturing industry', and 'construction', respectively, as shown in Figure 10. In addition, 'household & individual consumers' seem to be in a

marginal connection with 'others', 'finance & insurance' and 'association, repairing & other personal service'.

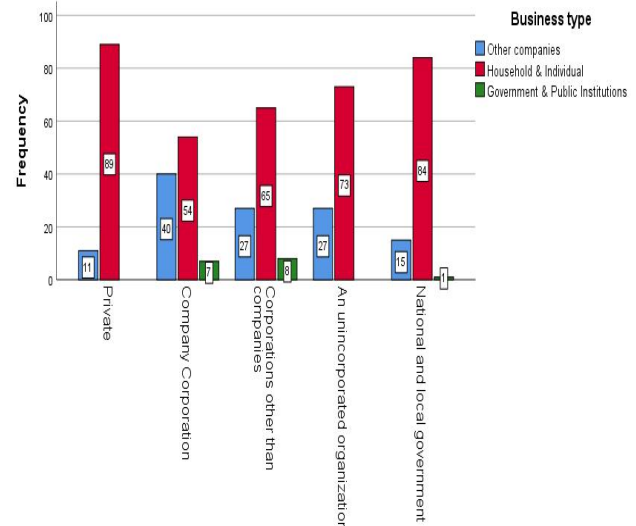as region and occupation in sections 3.3 and 3.4, 'government & public institutions' account for an absolutely small portion in all categories of group type, while, on the other hand, 'company corporations (40%)' do the greatest portion in all business group.

Table 2: Summary on occupation

| Dim. | Singular Value | Inertia | Chi Square | P value | Proportion of Inertia | | Confidence Singular Value | |
| | | | | | Account. | Cumul. | Std. Dev. | Correl. |
								2
1	.556	.309			.814	.814	.021	
2	.266	.071			.186	1.000	.043	.235
Total		.380	493.86	<.001	1.000	1.000		
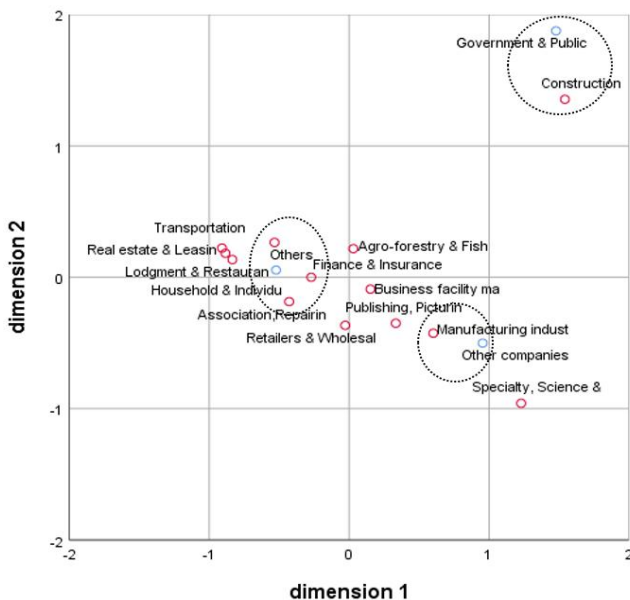
Figure 10: Row and column points with symmetric normalization

4.5. Association between Group type and Business types on sales orders

As we can see in Figure 11, 'household & individual consumers' take a relatively large portion in all categories of group type except 'company corporations'. As described

Figure 11: Business types by group type

The result of chi-squared test suggests the significant association between group type and business type on sales orders (p-value < .001). We can check the fact that the first and the second dimensions explain 87% and 12.9%, respectively of the total 10.2% of variance accounted for in the model, as shown below in Table 3.

From Figure 12, we can get findings that both 'household & individual consumers' and 'other companies' have to do with much 'national & local government' and 'company corporation', respectively. On the other hand, 'government & public institutions' are remote from all categories of group type.

Table 3: Summary on group type

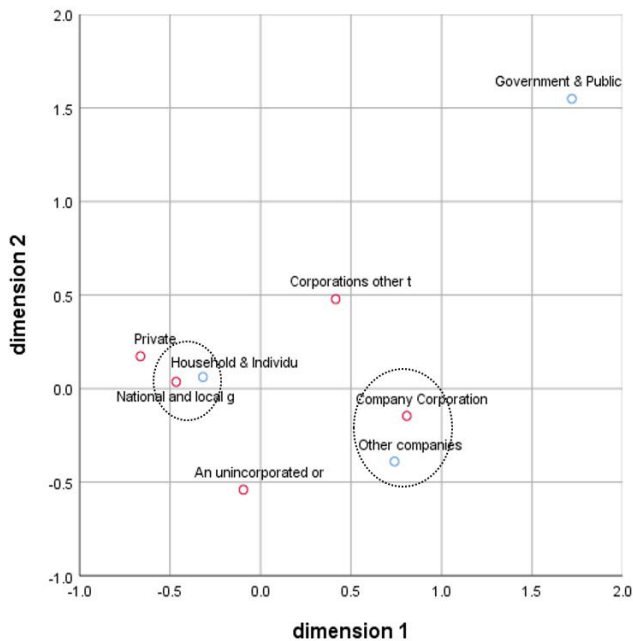| Dim. | Singular Value | Inertia | Chi Square | P value | Proportion of Inertia | | Confidence Singular Value | |
| | | | | | Account. | Cumul. | Std. Dev. | Correl. |
								2
1	.298	.089			.871	.871	.040	-.090
2	.115	.013			.129	1.000	.043	
Total		.102	51.04	<.001	1.000	1.000		

Figure 12: Row and column points with symmetric normalization

5. Concluding Remarks and Limitations

In this work, we summarize both ecommerce utilization and purchasing business by using bar chart and check existence of an association between two nonmetric variables, business type on sales orders and three different factors by using chi-squared test. In addition, the association between the categories of the two variables can be visually examined by correspondence analysis.

In summary, ecommerce was used much more in 'Seoul', 'Kyunggi', and 'Kyungnam' for region, and in 'retail & wholesalers' and 'transportation' for occupation, and in 'private businesses' for group type. Likewise, ecommerce purchasing is strong in 'Seoul', 'Kyunggi' for region, 'retail & wholesalers' and 'others' for occupation, and 'private businesses' for group type.

'Household & individual consumers' account for most of ecommerce sales in all regions, all group types, and occupations except 'specialty, science & technology services', 'manufacturing industry', and 'construction'.

We can conclude that business types on sales orders are closely associated with all factors – region, occupation and group type by significance of chi-squared test. The findings got from correspondence analysis are as follows: 'household & individual consumers' among business type on sales orders are closely connected with 'Chungbuk' and 'Kyungnam' for region, 'others', 'finance & insurance' and 'association, repairing & other

personal service' for occupation, and 'national & local government' for group type. On the other hand, 'other companies' among business type on sales orders, particularly, related to 'Chunnam' for region, 'manufacturing industry' for occupation, and 'company corporations' for group type. Finally, 'government & public institutions' are deeply linked to 'construction' for occupation.

In this study, we consider three factors such as region, occupation and group type for the purpose of detecting associations with business type on sales orders. Extending ideas and demographics, we may analyze association with additional factors such as purchasing items, purchase purpose, purchasing method, gender, age and so on in the future.

In order to activate domestic ecommerce, it is necessary to differentiate product awareness, marketing strategy and PR technique from planning to execution on website and to cooperate closely with logistics companies in relation to the delivery and logistics system construction (Kim et al, 2017).

Furthermore, it would be meaningful to implement customized strategies that fit each characteristic considering the three factors considered in this work.

References

Agresti, A. (2002). *Categorical data analysis* (2nd ed.). Hoboken, New Jersey: John Wiley & Sons Inc.
Benzercri, J. P. (1992). *Correspondence analysis handbook.* New York: Marcel Decker.
Brigitte, Le R. (2009). *Multiple correspondence analysis.* Thousand Oaks, CA: Sage Publications.
Clausen, S. E. (1988). *Applied correspondence analysis: an introduction.* Thousand Oaks, CA: Sage Publications.
Doey, L., & Kurta, J. (2011). Correspondence analysis applied to psychological research. *Tutorials in Quantitative Methods for Psychology, 7*(1), 5-14.
Greenacre, M. J. (1984). *Theory and applications of correspondence analysis.* New York: Academic Press.
Greenacre, M. J. (2007). *Correspondence analysis in practice.* Boca Raton, Florida: Taylor and Francis Group.
Hair, J. F., Black, B., Babin, B., Anderson, R. E., & Tatham, R. L. (2007). *Multivariate data analysis.* Toronto: Prentice Hall.
Hoffman, D. L., & Franke, G. R. (1986). Correspondence analysis: graphical representation of categorical data in marketing research. *Journal of Marketing Research, 23*, 213-227.
Jeong, D. B. (2015). A study on cluster and positioning of domestic electronic commerce based on purchasing motivation. *Journal of Korean Data & Information Science Society, 29*(4), 841-856.
Jeong, D. B. & Wang, Q. (2016). Evaluation on development performances on ecommerce for 50 major cities in China. *Journal of Distribution Science, 14*(1), 67-74.
Kang, H. W., & Chun, S. M. (2018). The current issues on domestic ecommerce regulations and global competitions: market dominance, data sovereignty, and amazon effects. *Korean Journal of Law and Economics, 15*(3), 355-374.
Kim, M., Jung, H. J., & Choi, A. R. (2017). Ecommerce activation

measures following the completion of Korea-China FTA. *Asia Trade Risk Management, 1*(2), 43-66.

Steven, J. P. (2009). *Applied multivariate statistics for the social sciences.* New York: Lawrence Erlbaum Associates Inc.

Vin, C. H., & Chun, B. J. (2019). Platform and logistics innovation for ecommerce competitiveness: the case of amazon.com. *Electric Trade Review, 17*(4), 1-22.

Yang, B. H. (2013). *Understanding multivariate analysis.* Seoul: Communication books