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Service Value of Transportation Service Providers for E-Commerce Products in the New Economy Era: Creativity, Society and Environment

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ABSTRACT

The logistics business is growing in line with the e-commerce business, but the majority of the market share belongs to the large service providers and foreign companies. This research aims to explore critical factors and the model of service value of transportation service providers for e-commerce products in new economy era in the contexts of creativity, society and environment. The study was a mixed-method research. The quantitative study, using questionnaire, was collected the data from 520 samples in Bangkok who have used the internet to place order for goods online. Stratified sampling from five populations comprising school-age, adolescent, working-age, adult and elderly was used in the study. The data was analyzed by structural equation modelling. Then, the qualitative study from 5 in-depth interviews was used to find the guidelines for developing sustainable business performance. The results showed that 1) the significant service value consisted of environmental responsibility (ENV), service convenience (CON), corporate image (IMA), social Responsibility (SOC), Staff Quality (STA), Delivery (DEL), and Efficient Information Handling (INF) and 2) service value directly and indirectly affected the sustainable business performance of e-commerce transportation service providers, with indirect effect of perceived service value. These results could be used to develop the sustainable competitiveness of Thailand small-sized transportation service providers.

Keywords
Service Value, Perceived Service Value, Sustainable Business Performance

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Introduction

In the new economy, the world has changed business models coming to an era driven by innovation in communication technology and highly efficient information management systems. As a result, people's lifestyles are more comfortable. In addition, the growth of e-commerce businesses and COVID-19 situation creates a freight forwarding business that has a service model to support such growth of a huge market. Transportation is considered to be an important front line in customer service value. If customers are not impressed, they may turn to other online store services [1]. The transportation service transaction is an operation aimed at responsiveness, reliability, security and cost efficiency by integrating the relevant departments since suppliers, manufacturers, wholesalers, retailers, customers, warehouses, shippers and others through communication using computer systems and the internet to plan ahead. Then, the movement of products is determined in every channel to each department from the origin to the destination to be punctual for production, warehouse management, distribution, and delivery to the customer in order to maximize customer satisfaction [2].

Due to the continuous expansion of e-commerce business, it may affect the logistics service providers that have more competitors, especially foreign competitors, and affect the national economic stability by reason of money flowing outside the country. Small and medium sized logistics service providers, therefore, should adjust who their operations to keep their existing customers and find ways to add new customers because ASEAN Economic Community causes high competition among both domestics and foreign logistics service providers as well as large companies turn to compete for the market share of medium and small logistics service providers due to the economics recession in many countries. Transportation service providers (TSP), therefore, must adapt themselves and change their way of thinking to meet the increasing market competition and to build the credibility of the business in the long run, as suggested by Department of Business Development, the Ministry of Commerce [3].

Based on these problems, the small and medium-sized logistics service providers must have appropriate quality of service to build the satisfaction and loyalty of target customers. This will provide the organization with a competitive advantage in the new economic era driven by communication innovation that responds to the needs of users quickly. Therefore, this research aims to explore critical factors and the model of service value of transportation service providers for e-commerce products in new economy era in the contexts of creativity, society, and environment that influences the sustainable performance of e-commerce services. The results will benefit the social and environmental development of the country and can be used as a guideline in the service business to develop business organizations continuously and create added value for the nation as well. In addition, it also supports further study to obtain in-depth research and to be able to solve problems for Thailand business organizations in sustainably.

Literature Review

Sustainable Business Performance

At present, the economic model has changed. In the modern economy, every business organization must pay attention to

the economy that deals with sales, market share, profits, which are the main factors of every business, resulting from the implementation of activities to meet the needs and satisfaction of consumers. Businesses, however, must have social and environmental operations along with the business growth, especially the transportation business, which clearly affects the environment. Transportation service providers, therefore, must realize both environmental and economic performance that generates business growth in profit, people, and planet, as suggested by John Elkington [4], to create business sustainability [5].

Service Value

Customer service of logistics service providers is the operation of cooperation of all logistics activities in the organization as one such as production, service, marketing, etc. to add value to the organization resulting in customer satisfaction and corporate success. Customer satisfaction is a positive reaction to a product or service that depends on the excess of the value received from above-standard service value, or over other competitors. This service value is therefore valuable to help keep customers or users from getting lost in the service with competitors. Customer service in each organization has many different elements in each organization, for example, it can provide the customers with right service, right information, right place, right time, right condition, right quantity, and amount right price. Proper logistics services must go hand in hand with good logistics management along with lowest point of operating cost to result in the organization's business success in responding with positive interactions, such as customer satisfaction, repeat purchase, and word of mouth, which is a measure of loyalty to an organizations or service providers [2]. As suggested by Thai [6], the quality of logistics services is transportation value activities that determine customer satisfaction, resulting in business competitiveness. Service value plays a key role in supporting a company's performance and business success by which logistics managers can use a suitable service approach suitable for the situation or the expectations of the users. It will result in confidence in the quality of the management perceived by service recipient.

In addition, previous research, as conducted by Fernandes, Moori and Filho [7], portrays the mediation effect of service quality on the effect of logistics capabilities on customer satisfaction. Kamble and Raut [8], besides, depicts that quality of information, order process, order quantity, on time delivery, order accuracy, order quality, order conditions, order tolerance management, and the quality of personal contact are important factors of logistics service quality. While Gil-Saura, Berenguer-Contri and Ruiz-Molina [9] identifies that logistics service value quality affects perceived service value, customer satisfaction, and customer loyalty, in which customer satisfaction and loyalty are the indicators of service business success. Phrapratanporn, Wararatchai, Aunyawong and Nik [10], moreover, suggests that business growth, customer satisfaction, management potential, employee satisfaction, and innovative organization are the indicators of business performance of logistics service providers. From the above information, the research hypothesis can be as follows.

H1: Service value has a direct effect on sustainable business performance.

H2: Service value has a direct effect on perceived service value.

H3: Perceived service value mediates the effect of service value on sustainable business performance.

Perceived Service Value

Perception is a psychological process by which an individual chooses to interpret a perceived stimulus. In business, customer perception is a component of consumer psychology, which is an internal factor in consumer buying decision patterns. It will have a direct effect on the consumer buying decisions that step from attending to perception, finding information to make decisions, and evaluating purchase options [11]. This can be well developed as a service metric of the logistics business. In the logistics business, the perception of service quality can be defined as evaluation of the service activities of a logistics or transport provider regarding the utility of goods or services in comparison between the money paid and the time wasted compared to the value received. The more perceived value affects the more satisfaction and loyalty [12]. In a past, a measure of perceived value obtained from the activities to create values, consisting of functional value, social value, emotional value, epistemic value, and condition value [13]. Later perceived value was developed in the context of retail stores using 3 dimensions of measurement: functional value, social value, and emotional value [14]. The research, therefore, hypothesizes that:

H4: Perceived service value has a direct influence on the sustainable business performance.

Methodology

This research focuses on finding the service value of e-commerce transportation service providers in the new economy era in the contexts of creativity, society and environment. The questionnaire was used to describe the results from the quantitative study on the opinion of e-commerce product buyers in related issues as reviewed. The interview, moreover, used to find the guidelines for developing sustainable business performance of e-commerce TSP.

Population and Sample

For quantitative study, the population was 6,685,181 internet users purchasing e-commerce products in Bangkok, classified into five spans of age as concluded by National Statistical Office [15]. The sample size of 520 respondents was more than 20 times the number of variables in the study (20*16) [16] (Angsuchot, Wichitwanna, and Pinyopanuwat, 2011) to ensure normal distribution, which was the preliminary analysis. The study had 2 steps in sampling: First, Stratified sampling based on proportion to size was use to classified sample size of 520 into 5 groups: 7 students

(1.3%), 134 teenagers (25.7%), 172 workers (33.1%), 161 elders (31%), and 46 old persons (8.9%), arisen from the survey of the number of internet users purchasing e-commerce products in Bangkok. Second, simple random sampling was used to select the sample by submitting a questionnaire in google form to the online social media group of each sample. For qualitative study, 5 executives of logistics companies were asked to join an in-depth interview.

Research Instrument

The research used a questionnaire as the research instrument for quantitative study. The questionnaire will be verified its content validity using >0.50 IOC [17] and construct validity using second order confirmatory factor analysis. The results found that the questions were consistent with the empirical variables, along with the verification of reliability with >0.80 Cronbach's Alpha Coefficient, Construct Reliability (CR) and Average Variance Extracted (AVE) of latent variables [18], as shown in Table 1, while interview form was used for qualitative study.

Statistical and Data Analysis

The data analysis of the research was based on the research objectives, which detailed as follows: first, descriptive statistics consisted of percentage to survey the characteristics of personal factors, second, exploratory factor analysis (EFA) of the cost factor of e-commerce transportation service in the new economy era, third, confirmatory factor analysis (CFA) of service value, perceived service value, and sustainable business performance of e-commerce product transportation service providers, and forth, structural equation modeling (SEM) to find the model of service value of the e-commerce transportation service providers in new economy era in the contexts of creativity, society and environment.

Table 1 Verification of Research Instrument

Latent Variables	Cronbach's Alpha Coefficient	CR	AVE
SERV	0.945	0.972	0.541
PERC	0.885	0.954	0.514
PERF	0.940	0.944	0.591

Data Analysis

1. EFA results

The results indicated that Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) of .897 (>0.80) and Bartlett's Test of Sphericity with statistical significance at .000 level verified the appropriateness to perform factor analysis, as recommended by Aungsuchot et al. [16]. Then, factor rotation was performed to obtain a definite co-factors using orthogonal rotation by Varimax method, resulting in 7 new factors, 34 variables, and factor loadings, as shown in Table 2.

First, Environmental Responsibility (ENV) was found that the factor with the highest factor loading was "usage of environmentally friendly shipping packaging usage (ENV_2)", followed by "passing a strict legal smoke emission audit (ENV_1)", "emphasizing electronic e-documentation to reduce paper and equipment usage (ENV_3)", "taking back used shipping package to reduce customer burden (ENV_4)", "seriously reducing energy consumption in operations (ENV_5)" and "routing by modern computer program to save transportation costs and protect the environment (ENV_6)", with the factor loadings of .766, .737, .710, .655, .604 and .553, respectively. Second, Service Convenience (CON) was found that the factor with the highest factor loading was "flexible management of product flow (CON_4)", followed by "fast service time (CON_3)", "emphasizing no error from service usage (CON_5)", "The high-precision service computer usage (CON_2)" and "the convenient service contact channel (CON_1)", with the factor loadings of .816, .792, .725, .721 and .690, respectively. Third, Corporate Image (IMA) was found that the factor with the highest factor loading was "behavioral image and environmental responsibility for better human quality of life (IMA_4)", followed by "reputation and acceptance according to international standards (IMA_3)", "formal image as a sincere and willing transportation service provider (IMA_5)", "the behavioral image, including the social and environmental responsibility for human safety (IMA_2)", and "company ethical image (IMA_1)", with the factor loadings of .783, .741, .731, .686 and .659, respectively. Forth, Social Responsibility (SOC) was found that the factor with the highest factor loading was "strict preventive measure for the spread of disease in accordance with the guidelines of the public health system (SOC_6)", followed by "cooperating with the community in career development (SOC_5)", "appropriate welfare for all employees in the organization (SOC_4)", "emphasizing operations with social responsibility for human safety (SOC_7)", "supporting solving social problem in both community and whole country (SOC_3) and "encouraging employee growth in responsible lines (SOC_1), with the factor loadings of .786, .783, .680, .622, .550, and. .401, respectively.

Fifth, Staff Quality (STA) found that the factor with the highest factor loading was "the ability to perform tasks according to service provider guidelines (STA _4)", followed by "staff trained to know / understand customer needs and requirements (STA _3)", "responsiveness for quick problem solving (STA _5)", "service mind of staff (STA _2)", and "attitudes and behaviors to respond to customer satisfaction (STA _1)", with the factor loadings of .784, .768, .722, .654 and .553, respectively. Sixth, Delivery (DEL) found that the factor with the highest factor loading was "shorter delivery time (DEL_2)", followed by "special delivery method in the event that the product cannot be delivered normally due to the urgent demand of the product (DEL_3)", "correct and up-to-date delivery situation (DEL_4)", and "specifying the delivery time every time customers use the service (DEL_1)", with factor loadings of .795, .788, .711 and .658, respectively. Seventh, Highly Efficient Information Management (INF) was found that the factor with the highest factor loading was "software system to provide advices on inventory management and ordering for cost-effective service usage (INF _1)", followed by

"software system that can checks customer ordering history (INF _2)" and "software system to deal with the product shortage problem of the consumer's business (INF _3)", with factor loadings of .811, .808, and .729, respectively.

Table 2 Orthogonal Rotation by Varimax Method

	Factors						
	1	2	3	4	5	6	7
ENV_2	**.766**	.075	.144	.073	.093	.185	.003
ENV_1	**.737**	.035	.044	.070	.110	.171	.179
ENV_3	**.710**	.116	.092	.132	.107	.276	.008
ENV_4	**.655**	.260	.064	.283	.070	.080	.258
ENV_5	**.604**	.236	.157	.310	.062	.077	.270
ENV_6	**.553**	.261	.147	.319	.077	.143	.286
SOC_2	.451	.118	.350	.383	.210	.023	-.020
CON_4	.100	**.810**	.141	.057	.173	.071	.008
CON_3	.113	**.792**	.023	.141	.071	.075	.130
CON_5	.080	**.725**	.170	.099	.110	.074	.149
CON_2	.153	**.721**	.080	.125	.195	.153	.089
CON_1	.192	**.690**	.124	.040	.237	.161	.095
IMM_4	.099	.092	**.783**	.100	.226	.108	.011
IMM_3	.098	.047	**.741**	.030	.226	.097	.096
IMM_5	.154	.144	**.731**	.086	.082	.079	.111
IMM_2	.098	.161	**.686**	.097	.095	.226	.119
IMM_1	.064	.079	**.659**	.246	-.028	.178	.140
SOC_6	.098	.090	.097	**.786**	.114	.109	.114
SOC_5	.099	.046	.052	**.783**	.137	.197	.182
SOC_4	.246	.062	.110	**.680**	.203	.131	.061
SOC_7	.234	.234	.197	**.622**	.193	.174	.048
SOC_3	.421	.173	.258	**.550**	.220	-.035	.052
SOC_1	.362	.094	.385	**.401**	.232	.136	-.042
STA_4	.125	.081	.104	.084	**.784**	.117	.175
STA_3	.064	.182	.137	.140	**.768**	.010	.148
STA_5	.176	.228	.097	.157	**.722**	.098	.130
STA_2	.116	.193	.140	.219	**.654**	.198	.075
STA_1	.046	.138	.197	.190	**.553**	.158	.081
DEL_2	.135	.195	.196	.211	.151	**.795**	.164
DEL_3	.304	.085	.196	.087	.144	**.788**	.183
DEL_4	.299	.116	.215	.175	.201	**.711**	.129
DEL_1	.214	.270	.247	.231	.148	**.658**	.103
INF_1	.171	.141	.144	.082	.161	.134	**.811**
INF_2	.156	.131	.143	.174	.151	.156	**.808**
INF_3	.163	.166	.123	.106	.280	.156	**.729**

2. Path Analysis Results

The results found that 1) the service value (SERV) of e-commerce transportation service providers had a positive direct effect on sustainable business performance (PERF), with a statistically significant effect size of 0.32, therefore, the hypothesis 1 was accepted, 2) SERV of e-commerce transportation service providers had a positive direct effect on perceived service value (PERC), with a statistically significant effect size of 0.83, thus, and hypothesis 2 was accepted, 3) PERC mediated the effect of SERV on PERF, with a statistically significant effect size of 0.51, so

hypothesis 3 was accepted, and 4) PERC had a positive direct effect on PERF, with a statistically significant effect size of 0.62, therefore, hypothesis 4 was accepted, as shown in Figure 1 and Table 3.

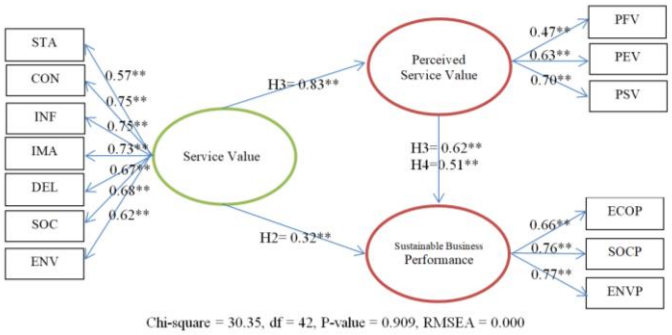

Figure 1. Structural Equation Modelling

Table 3. Hypothesis Testing Results

Hypotheses	Accept	Reject
H_1 Service Value → Sustainable Business Performance	✔	-
H_2 Service Value → Perceived service value	✔	-
H_3 Service Value → Perceived service value → Sustainable Business Performance	✔	-
H_4 Perceived service value → Sustainable Business Performance	✔	-

From Table 4, the service value (SERV) included seven observed variables, by which Service Convenience (CON) and Highly Efficient Information Management (INFO) were the most important factors, followed by Corporate Image (IMA), Social Development (SOC), Delivery (DEL), Environmental Development (ENV), Staff Quality (STA), with the factor loadings of 0.75, 0.75, 0.73, 0.68, 0.67, 0.62,and 0.57, respectively, and R-Squared of 56, 56, 53, 46, 45, 38, and 32, in turn. In addition, the Construct Reliability (ρc) was at a high level (0.790) and Average Variance Extracted (ρv) was at a moderate level (0.560). While Perceived Service Value (PERC) had three observable variables, comprising Perceived Social Value (PSV) as the most important factor, followed by Perceived Emotional Value (PEV), and Perceived Functional Value (PFV), with the factor loadings of 0.70, 0.63, and 0.47, respectively, and R-Squared of 49, 39, and 22, in turn. Furthermore, the Construct Reliability (ρc) was at a high level (0.866) and Average Variance Extracted (ρv) was at a moderate level (0.522). Whereas Sustainable Business Performance (PERF) had three observable variables, consisting of Environmental Performance (ENVP) as the most important factor, followed by Social Performance (SOCP), and Economic Performance (PECO) were 0.77, 0.76 and 0.66, respectively, and R-Squared of 60, 57, and 44, in turn. Additionally, the Construct Reliability (ρc) was at a high level (0.746) and Average Variance Extracted (ρv) was at a moderate level (0.526).

Table 4 Factor Analysis Results

Variable	Factor Loading		t-value	R^2	ξ
	B	SE			
Service Value (SERV)					
Staff Quality (STA)	0.57	0.11	10.45**	0.32	0.58
Service Convenience (CON)	0.75	0.11	13.31**	0.56	0.34
High Efficient Information Management (INFO)	0.75	0.11	12.07**	0.56	0.34
Corporate Image (IMA)	0.73	0.11	11.59**	0.53	0.37
Delivery (DEL)	0.67	0.10	11.27**	0.45	0.45
Social Development (SOC)	0.68	0.11	11.37**	0.46	0.44
Environmental Development (ENV)	0.62	0.11	10.45**	0.38	0.52
Perceived Service Value (PERC)					
Functional Value (PFV)	0.47	0.47	17.80**	0.22	0.48
Emotional Value (PEV)	0.63	0.04	24.22**	0.39	0.31

Variable	Factor Loading		t-value	R^2	ξ
	B	SE			
Social Value (PSV)	0.70	0.04	26.95**	0.49	0.21
Sustainable Business Performance (PERF)					
Economic Performance (ECOP)	0.66	0.05	19.88**	0.44	0.56
Social Performance (SOCP)	0.76	0.05	20.97**	0.57	0.43
Environmental Performance (ENVP)	0.77	0.05	19.88**	0.60	0.40
Correlation Matrix		(PERC)	(PERF)	(SERV)	
Perceived Service Value (PERC)		1.00			
Sustainable Business Performance (PERF)		0.90	1.00		
Service Value (SERV)		0.83	0.84	1.00	
CR and AVE		(PERC)	(PERF)	(SERV)	
Construct Reliability (ρ_c)		0.866	0.746	0.790	
Average Variance Extracted (ρ_v)		0.522	0.526	0.560	
Chi-Square = 30.35, df = 42, P-value = 0.90, RMSEA= 0.000, SRMR = 0.017, CFI = 1.00, GFI =0.99, AGFI = 0.98					

Note: *P < 0.05, ** P < 0.01, SE=Standard Error, B=Factor loading, ξ= Variance of Standard Error

Discussions

The results of the research provide ways to develop Thailand small transport businesses. In the past, all businesses were only competing for the highest profits, but social and environmental issues were deteriorating. The findings depicted that the main service value activities that results in business performance consists of highly efficient information management, service convenience, corporate image, and delivery, as in line with the recent studies [19-21]. These adhere to consumer behavior and high communication technology, which can be measured by consumer satisfaction from online marketing, online delivery, direct communication with customers, fast services, and willingness of services, resulting in more sales, higher market share, and business growth [10, 20]. In addition, the study has found that social and environmental development as well as service value is important to the consumers because at present the economic operation has changed in the modern economy. Every business organization must pay attention to the economy that deals with product sales, market share, and profitability, which are the main organizational factors, resulting from the implementation of activities to meet the needs and satisfaction of consumers. Businesses, however, must have operations that develop society and take care of the environment to grow along with the business growth, competitive advantage, and sustainable performance [22-27], especially the transportation business, which clearly affects the environment, since the e-commerce transportation business is in high demand from the users and helps to create jobs for people in society during Coronavirus crisis. It is expected to grow further from the behavior of people who are accustomed to comfort-oriented behaviors, safe from germs, and the expansion of e-commerce business (Interview with executives of logistics companies, February 5, 2021).

Conclusion

E-commerce logistics service providers should be focus on the service value of high-performance data management such as software systems for inventory management and ordering advices to control the service value, software system that can check the history of customers' orders, software system to help take care of the product shortage problem of the consumer's business, preventing the occurrence of out-of-stock problems. In terms of the service convenience, it should base on flexible management of the flow of products, fast service time, no error from using the service, usage of computer system to receive precise and convenient services. At the same time, social development must be addressed, such as strict preventive measures for the spread of disease according to the guidelines of the public health system, collaboration with the community in career development, appropriate welfare for all employees in the organization, social responsibility for human safety, continuous support on social problems at both local and national levels based on the entity's financial cost capabilities, and encouraging employees to grow in their responsibilities. For the environmental development, transportation service providers must use environmentally friendly packages only, use trucks that pass a comprehensive smoke emission check in accordance with the law, use e-documentation to reduce paper and equipment usage, store or accept used shipping packages to reduce customer burden, seriously reduce energy consumption, use modern computer programs for routing, and save transportation costs to protect the environment.

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