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HOW IMPLEMENTATION LEVEL OF PL RESPONSE SYSTEM AFFECTS ON CUSTOMER'S BUYING INTENTION

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ABSTRACT

In the meantime, Korea has only produced and sold product that were proven safe through various certification systems before market introduction. The safety of these products are being managed through market inspection systems after the products are supplied in the market, through constant safety inspections and recall of defective products. However, in spite of the safety management policies of government agencies and corporations, the damage caused by the distribution of unsecured products constantly occurs and the people are not completely free from the anxiety of the product accidents. Therefore, it is necessary to introduce an evaluation system that regularly checks and improves the level of the company's product liability (PL) response activities. This study used SPSS to analyze exploratory factors and reliability and AMOS to confirm a hypothesis through exploratory factor and path analysis. We found out that only the strategy and technology of companies have significant effects on a consumer's perception and utilization intention, among the detailed implementation plans of PL response system presented in previous research. In addition, consumers' perceptions have a significant effect on consumers' intention to use, and consumers' perception and utilization intention have a significant effect on the purchase intention of a product.

Keywords: *Consumers' Perceptions, Consumers' Intentions of Use, Product Liability Response Levels, Product Purchase Intentions*

1. INTRODUCTION

Much attention is given to the safety of consumer products with the recent humidifier disinfectant incident and cellular phone battery accidents. Originally, consumers were more focused on a product's design and quality (performance), price, brand, etc. but consumers more interested in a product's safety are increasing. Corporations must now focus on safety first and foremost when developing products. It is highly likely that in today's already complicated structure of society, an unsafe product could lead to disastrous results. Our society is at a stage where the safety of products should lie not only in the hands of experts or partially in manufacturing companies but in consumers, corporations and the government. We must be aware that all must do their part. If there is an issue with in the development process like the humidifier disinfectants, all products are potentially faulty and corporations could be responsible for paying for damages [11, 12].

It is important for companies to meet various safety standards and related regulations that are required in the design and development stages of products; to predict the hazards of products in any possible way; and to establish prevention measures. In order to systematically establish these steps, it is necessary to ensure the safety of the product from its development stage to its life cycle, which includes design, manufacture, shipment and disposal. Efforts must be made to build a product liability response system responsible for products in order to systematically respond to possible product accidents. It is desirable for companies to build a product liability response system to protect consumers from hazardous products that are distributed in the market. However, as seen in the recent humidifier disinfectant incident, companies

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are instead focused on making profits and minimize activities which secure product safety, resulting in a public unprotected from illegal, malfunctioning products.

Therefore, companies must voluntarily create a product liability response system to ensure consumers are safe from products being distributed in the market. It is necessary to introduce a plan to manage and oversee the creation of such a system that can effectively respond to potential product accidents. A government-designated certification institution should take care of such a plan and grade the manufacturing company's product liability prevention steps and level of actions taken to respond so that the company can understand its own response competency. It should also help companies take such steps as strengthening any lacking areas. Additionally, the government should officially publish manufacturing companies' response levels in newspapers and broadcasts to satisfy customers' right to know and block companies' products if their response levels for product liability are insufficient or if they are lacking in their efforts to reform deficiencies in activities to improve safety.

However, there is still insufficient research regarding the introduction and necessity of assessment systems to assess a manufacturing company's product liability response levels responsibility and regarding customers' perception and use intentions. If a system to assess manufacturing companies' product liability response levels are really introduced, a measure to increase the usability of the assessment results must also be reviewed.

Thus, this study seeks to analyze if a system assessing a manufacturing company's product liability response levels is introduced whether the assessment criteria deduced from existing research is perceived as necessary information by consumers; whether customers intend to use this research to achieve their goals; and whether this kind of consumer perception and intention of use will translate into actual purchase of products. This study hopes to use the results to confirm the necessity of a system assessing the product liability response levels and supplement and improve assessment criteria so that an evaluation system that is possible to realize is introduced.

This paper is composed as follows: Chapter 1 describes the objectives and necessity of this study. Chapter 2 presents theoretic concepts regarding consumers' awareness, intents of utilization and product purchase for the product liability related evaluation items. Chapter 3 describes the study models and methods to accomplish the objectives of this study. Chapter 4 presents the research results and analysis on the results. And finally, Chapter 5 describes the conclusions of this study and the limitations of this study.

2. LITERATURE REVIEW

2.1 Assessment Criteria for Product Liability Response Level

In order to systematically prevent and respond to product accidents, companies should prepare for product liability by managing an enterprise-based product liability response system during the lifecycle of the product (from the purchase stage of the raw materials and finished products to the stages of planning, design, manufacturing, distribution, consumption to the after service stage). A company-wide product liability response system is a systematic and organized system in which a company prepares a product liability prevention (PLP) plan to produce a product without prior defects; a product safety (PS) plan to ensure product safety; and a product liability defense (PLD) plan which minimizes a company's loss in case of an accident. In order for the product liability response system to have a practical effect as a product liability prevention and defense measure for a company, detailed action plans should be established through the essential components directly or indirectly affecting the management of the enterprise [8, 15, 18, 19, 21].

The summary or existing research regarding the role of a detailed action plan is as follows [18, 19]: the establishment of measures and countermeasures to minimize product accidents in during the planning, design, and production stages; the creation of an organizational structure for systematic response; education programs to help members' fully understanding; and securing investment and product safety to maintain continuity of this strategy [18, 19, 21]. Therefore this study will examine whether the detailed implementation plan for evaluating the product liability response level of manufacturing companies, which are selected as assessment criteria as shown in <Table 1>, have an effect on consumers' perception and use intentions.

2.2 Assessment Criteria for Product Liability Response Levels and Consumer Perception

The meaning of perception that we are familiar with is defined as follows. The perception process refers to the totality of human knowledge,

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in a broad sense, and means knowledge of a certain range of objects in a narrow sense [6]. Perception begins with a human's action. Through this action, for the first time an immediate, individual, and detailed emotion awareness forms from a sensory intuition. This is not capturing the nature of things but rather something like an external impression. Humans use this emotional awareness as a base and continue to practice. Mistakes are corrected, and humans use reasoning, judgment and inference to gain an essential understanding of objects. This rational perception is generally referred to as perception [22].

Many researchers re-established the meaning of perception from the perspective of a consumer as explained in the following. Kim [9] states that perception is the stage when a consumer becomes motivated or feels the need to purchase a product. Consumers perceive the need to purchase a product or through become motivated to make a purchase through an external stimulus. Cho [5] suggests that perception is when a consumer obtains information or how the consumer feels from their reaction (behavior) to this information. This study seeks to understand whether the consumer perceives the assessment criteria to judge a manufacturing company's product liability response levels as necessary information.

2.3 Assessment Criteria for Product Liability Response Levels and Consumers' Intent of Use

Intent is a thought or plan to do something. It also means the resolution to try to take a specific action to achieve a certain goal when the right chance presents itself. Utilization means acceptance of a specific system or policy while simultaneously actively responding to an objective target and producing a new value during said process [13]. Son [20] defined intent of utilization as an intention used for new innovation or acceptance of information technology. Therefore, this study seeks to understand if, when consumers perceive an assessment of a manufacturing company's product liability response levels as objective knowledge, they have an intent to utilize this information to achieve their goals.

2.4 Consumers' Product Purchase Intent

A consumer's product intent is defined as follows. Purchase intention is an intermediate variable between consumer attitudes and behaviors in regards to products and has been used to predict future consumer purchasing behavior [17]. In general, consumers express their anticipations of a product before purchasing it, so a consumer's intention before purchase is affected by his/her attitude prior to the purchase and is formed again by before purchase anticipation. In general, consumers are highly influenced by opinions and recommendation of other consumers in purchasing products, because communication among the members has a strong influence on consumer purchase behavior [2, 14]. Lee [16] and Engel *et al.* [7] have defined consumers' beliefs and attitudes related to certified company products as a consumer's will prior to actual purchasing behavior. This study tries to understand whether assessment of manufacturing companies' product liability response levels is perceived as objective knowledge by consumers and affect their intent of utilization. If it does, the study seeks to understand if this has an impact on actual purchasing behavior.

3. RESEARCH METHODOLOGY

The company needs a system to ensure the safety of a product during the product life cycle (during the product planning, design, manufacture, and shipment) and to prevent and respond to product liability accidents that occur by using a response system to systematically managing such activities. It is also necessary to continue to identify product liability activities and to continuously improve deficiencies. Although it is desirable for companies to voluntarily conduct product liability countermeasures to ensure the safety of consumers from products distributed on the market, and to constantly check and improve the system to respond effectively to accidents, if companies put forth only minimal efforts for reasons of saving on costs, this can lead to fatal accidents.

Therefore, it is necessary to introduce an evaluation system that regularly checks and improves the level of the company's product liability response activities. Also, it is necessary to take action to block a company's insufficiently improved products revealed in the evaluation results and make these results visible to consumers. A consumer's objective knowledge and perception will be impacted by receipt and utilization of the evaluation results. Thus, consumers' beliefs and behavior regarding companies with good products will show in actual purchasing behavior [1].

This study used SPSS statistical software to analyze exploratory factors and reliability and to confirm a hypothesis through exploratory factor and path analysis using the AMOS program. First, exploratory factor analysis was conducted on information deduced from existing research: the product liability response level of the

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manufacturing companies, and consumers' perception, utilization, and product purchase intention. In the exploratory factor analysis, the items with factor loadings of less than 0.5 and those with lower total reliability were removed, and the items whose measurement were

Table 1 Survey Composition

Factor	Item	Result
Strategy	Establishment of product safety management plan(S1)	Accepted
	Establishment of preventive plan(S2)	Accepted
	Establishment of product safety measure(S3)	Accepted
	Establishment of defensive measure(S4)	Accepted
	Establishment of product life-cycle through benchmark(S5)	Rejected
Organization	Formation of an organization preparing for product safety(O6)	Rejected
	Establishment of reporting process to CEO(O7)	Accepted
	Cultivation of PL experts in companies(O8)	Accepted
Training	Adoption of PL education programs for ensuring product safety(T9)	Accepted
	Sharing and distribution of PL awareness among participants(T10)	Accepted
	Education of regulation and manual regarding product safety(T11)	Rejected
Technology	Evaluation of product safety(Te12)	Accepted
	Securing accident-cause-analysis techniques(Te13)	Accepted
	Secure product safety meeting the legal standard(Te14)	Accepted
	Securing appropriate process control techniques(Te15)	Rejected
	Record and storage of safety evaluation(Te16)	Rejected
Investment	Join a PL insurance(I17)	Rejected
	Securing risk management cost(I18)	Rejected
	Securing investment cost for ensuring safety(I19)	Rejected
Awareness	PL mind establishment of CEO(A20)	Accepted
	Enhancement of participants' product safety awareness(A21)	Accepted
	Awareness of managers' need for safety education(A22)	Accepted
Consumer Perception	Strengthening the company's activities to reduce product defects (CA1)	Accepted
	Enhancement of the company's domestic competitiveness (CA2)	Accepted
	Enhancement of the company's international competitiveness (CA3)	Accepted
	Protection of consumers' rights (CA4)	Accepted
	System improvement to increase product safety (CA5)	Rejected
Consumers' Intentions of Use	Utilization of assessment results (CUI1)	Accepted
	Utilization of products after purchase (CUI2)	Accepted
	Recommendation of evaluation system to others (CUI3)	Accepted
	Utilization of evaluation results to purchase safe products (CUI4)	Accepted
	Critical information for consumers (CUI5)	Rejected
Product Purchase Intent	Purchase of products noted by assessment results of response levels	Accepted
	Prioritization of purchasing products of companies that participated in assessment of response levels	Accepted
	Prioritization of purchasing products of companies with good results that participated in assessment of response levels	Accepted
	Purchase of product even if expensive as long as assessment results were good	Rejected
	If the assessment results are good, purchase of products regardless of existing users' judgments	Rejected

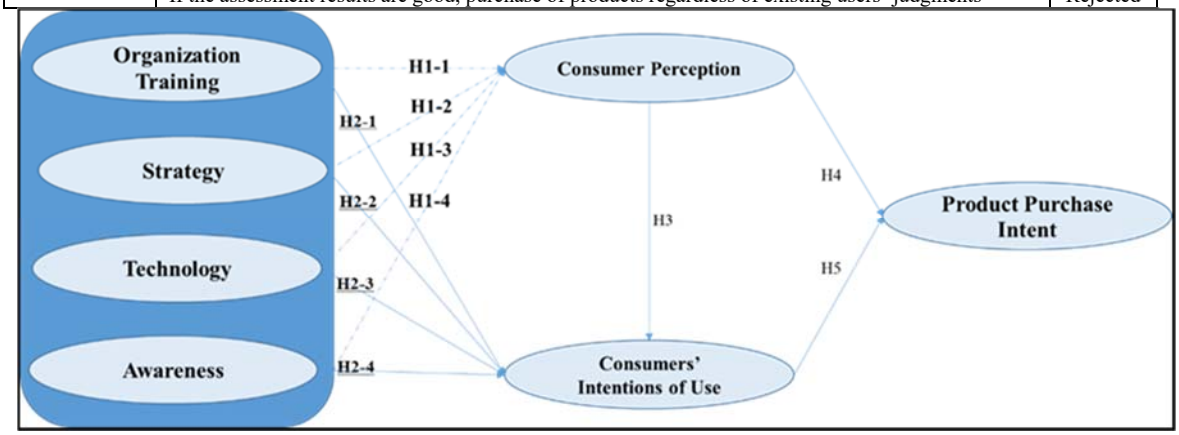

Figure 1 Research Model

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not classified by factor were also deleted. Table 1 shows the results of the exploratory factor analysis.

This study set up a research model based on the existing studies where the assessment criteria for a manufacturing company's product liability response levels had a significant effect on consumers' perception and intent of use and on consumers' perception and intent of us when intending to purchase a product. The study model is the same as Figure 1.

4. RESEARCH RESULT

4.1 Sample Demographics

The study distributed a total of 230 surveys and collected 201 from March 1 to March 26, 2017. The demographics of the survey participants are as follows. 56.7% (114) were men and 43% (87) were women. In terms of marriage, more were single 67.2% (135) than married 32.8% (66). The most participants came from the age range 20 to 29 years old, 61.7% (124 persons), then those between 30 and 39 18.9% (38 persons), those aged 40 to 49 12.9% (26 persons) (11%) and 1% (2 persons) for those over 60 years old. Of those surveyed for occupation, 53.2% (107) were students, followed by office workers (11.4%), freelancers (7.5%), self - employed and housewives (7%).

4.2 Exploratory Factor Analysis

In this study, principal component analysis was used to measure the validity of exogenous variables and endogenous variables before confirmatory factor analysis to verify the validity of the measurement scale. For this reason, we adopted the orthogonal rotation method (Varimax). In addition, the items with Eigen-Values of 1.0 or higher, factor loadings of 0.5 or less, and items that lower the overall reliability were removed and the reliability was analyzed by setting the Cronbach's a value to 0.6 to increase the consistency of the items. In order to derive more accurate analysis results, exogenous and endogenous variables were separated and exploratory factor analysis and confirmatory factor analysis were conducted.

To summarize the validity results, organizational and educational items among the factors belonging to exogenous variables were integrated into one variable. These results show that, in order to organize the organization to prepare for product liability, the education of the members is prioritized and the improvement of the recognition of all the members is needed first [21]. Table 2 and 3 show the results of exploratory factor analysis of exogenous variables and endogenous variables.

4.3 Confirmatory Factor Analysis

In this study, confirmatory factor analysis was conducted on the items that were verified through the exploratory factor analysis and reliability test. In order to derive the optimal state of item composition for each step, the fitness evaluation was performed by using the results of Browne and Cudeck [3] and Chang [4] and using CMIN/df (<3.0) and GFI (Goodness-of-Fit Index; 0.9), AGFI (Adjusted Goodness-of-Fit; ≥0.8), CFI (Comparative Fit Index; ≥0.8), RMR (Root Mean Square Residual; ≤0.08). Table 4 and 5 show the results of confirmatory factor analysis of exogenous variables and endogenous variables. The fit index of exogenous variables and endogenous variables was close to the standard value and was derived as a value indicating a satisfactory level of fitness.

4.4 Hypotheses testing

In order to verify the research model proposed in this study, a path analysis was conducted to determine whether the hypothesis was adopted using the AMOS statistical program. As shown in Table 6, GFI was not lower than the recommendation index of 0.9, while CMIN/DF = 2.197, GFI = 0.810, AGFI = 0.764, CFI = 0.888 and RMR = 0.042. It is judged that the suitability of the proposed model is not significantly lowered. Based on the results of the structural equation model analysis, the hypotheses tested are as follows. Hypothesis testing is based on the value of the standardized path coefficient, the direction of influence, and the related C.R value.

The first hypothesis was: the level of product liability response level of manufacturing firms will have a positive effect on consumers' perceptions. Only strategy and technology items had significant influence on consumer perception, and education/organization and awareness were not significant. These results indicate that the technology and strategy of the manufacturing companies have a significant impact because the product selection criteria of consumers has been changed to recognize the importance of safety for products, due to the recent incidents of humidifier disinfectant and smart phone battery combustion incident. Therefore, to ensure the safety of products, companies must establish systematic strategies to comply with relevant laws and market requirements and operate a product liability response system.

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The second hypothesis was: the level of product liability response level of manufacturing firms will have a positive effect on consumers' intent of utilization. Only strategy and technology items had significant influence on consumer intent of utilization, and education/organization and awareness were not significant. This result implies that the strategies and technology items of the manufacturing company are worthy to be utilized for a purpose such as the purchase of products by consumers. Therefore, if a policy is introduced that provides the consumer with a product liability

Table 2 Exploratory Factor Analysis of Exogenous Variable

Item	Factor Analysis				Cronbach α	Alpha if item Deleted
	1	2	3	4		
Organization 8	0.772				0.825	0.745
Training 10	0.736					0.766
Organization 7	0.689					0.828
Training 9	0.686					0.772
Strategy 2		0.846			0.812	0.717
Strategy 4		0.775				0.800
Strategy 1		0.649				0.773
Strategy 3		0.633				0.763
Technology 14			0.811		0.816	0.726
Technology 12			0.685			0.750
Technology 13			0.611			0.769
Awareness 21				0.830	0.832	0.735
Awareness 20				0.725		0.799
Awareness 22				0.636		0.766
Eigen-Value	2.941	2.457	2.272	2.260		
Variance explanation power (%)	21.011	17.553	16.230	16.143		

Table 3 Exploratory Factor Analysis of Endogenous Variable

Item	Factor Analysis			Cronbach α	Alpha if item Deleted
	1	2	3		
Consumers' Intentions of Use 1	0.812			0.861	0.827
Consumers' Intentions of Use 2	0.758				0.831
Consumers' Intentions of Use 3	0.745.				0.823
Consumers' Intentions of Use 4	0.699				0.831
Consumers' Intentions of Use 5	0.619				0.845
Consumer Perception 2		0.853		0.834	0.753
Consumer Perception 3		0.848			0.788
Consumer Perception 1		0.658			0.782
Consumer Perception 4		0.529			0.834
Product Purchase Intent 3			0.830	0.837	0.759
Product Purchase Intent 2			0.817		0.759
Product Purchase Intent 1			0.587		0.799
Eigen-Value	3.298	2.788	2.267		
Variance explanation power (%)	27.479	23.230	18.892		

response level assessment results, it means that the consumer intends to utilize the assessment system and the result objectively and also to achieve a purpose.

Hypothesis 3 is: consumer perception has a positive effect on the degree of utilization of assessment criteria for product liability response levels. It is possible to make a diagnosis that reduces the risk of the company. Therefore, the consumer will be able to utilize the assessment results by various means as an opportunity to strengthen the competitiveness of the company.

Finally, Hypothesis 4 "consumer perception and purchase intention of product" and Hypothesis 5 "consumer's intention to utilize and intention to purchase" have a positive effect on

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each other. These results show that in a complex modern society, consumers can not know the detailed information about a company's technology, organization, and education program. Therefore, disclosure of product liability response levels of manufacturing companies is an opportunity to enhance corporate reliability. These policies will encourage consumers' perceptions to be positive,

Table 4 Confirmatory Factor Analysis of Exogenous Variable

Item	Estimate	S.E	CR	AVE	Construct Reliability	
Training 9	.779			0.5742	0.8423	CMIN/DF=2.493, P=0.000, GFI=0.897, AGFI=0.847, CFI=0.926, RMR=0.041
Training 10	.770	.094	10.963			
Organization 8	.800	.101	11.415			
Organization 7	.613	.102	8.517			
Strategy 3	.745			0.6131	0.8630	
Strategy 1	.728	.114	9.455			
Strategy 4	.640	.116	8.352			
Strategy 2	.795	.106	10.171			
Technology 13	.783			0.6404	0.8423	
Technology 12	.768	.092	10.781			
Technology 14	.773	.081	10.849			
Awareness 22	.820			0.6728	0.8604	
Awareness 20	.752	.084	11.236			
Awareness 21	.796	.083	12.015			

Table 5 Confirmatory Factor Analysis of Endogenous Variable

Item	Estimate	S.E	CR	AVE	Construct Reliability	
Consumers' Intentions of Use 5	0.706			0.6467	0.9014	CMIN/DF=3.089, P=0.000, GFI=0.881, AGFI=0.819, CFI=0.919, RMR=0.038
Consumers' Intentions of Use 4	0.744	0.100	9.671			
Consumers' Intentions of Use 2	0.776	0.109	10.043			
Consumers' Intentions of Use 3	0.743	0.106	9.649			
Consumers' Intentions of Use 1	0.755	0.110	9.802			
Consumer Perception 4	0.640			0.6423	0.8768	
Consumer Perception 3	0.732	0.144	8.574			
Consumer Perception 2	0.824	0.130	9.323			
Consumer Perception 1	0.808	0.133	9.212			
Product Purchase Intent 1	0.843			0.7295	0.8898	
Product Purchase Intent 2	0.761	0.086	11.724			
Product Purchase Intent 3	0.761	0.084	11.735			

and if the actual assessment results are good, will induce consumers to act and increase the purchase intention of the products. Table 6 shows the results of the exploratory factor analysis.

5. CONCLUSIONS

From the standpoint of manufacturing companies, supplying safe products to the members of society can be the foundation of corporate management activities and a source of corporate competitiveness. Supplying products that threaten the safety of our society members by obsessing over small profits will be fatal to companies, causing them to be rejected by society. Therefore, supplying safe products is the most important capability for a company to survive and grow into a global company [10].

In the meantime, Korea has only produced and sold that were proven safe through various certification systems before market introduction. The safety of these products are being managed through market inspection systems after the products are supplied in the market, through constant safety inspections and recall of defective products. However, in spite of the safety management policies of government agencies and corporations, the damage caused by the distribution of unsecured products constantly occurs and the people are not completely free from the anxiety of the product accidents.

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In this study, we found out that only the strategy and technology of companies have significant effects on a consumer's perception and utilization intention, among the detailed implementation plans of product liability response system presented in previous research. In addition, consumers' perceptions have a significant effect on consumers' intention to use, and consumers' perception and utilization intention have a significant effect on the purchase intention of a product. The implications of this study are as follows.

Table 6 Results of hypotheses testing

Hypotheses		Path	Estimate	S.E	C.R	P-value	Result
H1	H1-1	Organization/Training ▶ Consumer Perception	.189	.163	1.128	.259	Rejected
	H1-2	Strategy ▶ Consumer Perception	.386	.133	3.336	***	Accepted
	H1-3	Technology ▶ Consumer Perception	.351	.153	2.087	.037	Accepted
	H1-4	Awareness ▶ Consumer Perception	-.189	.164	-1.082	.279	Rejected
H2	H2-1	Organization/Training ▶ Consumers' Intentions of Use	-.136	.115	-.987	.323	Rejected
	H2-2	Strategy ▶ Consumers' Intentions of Use	.232	.097	2.361	.018	Accepted
	H2-3	Technology ▶ Consumers' Intentions of Use	.371	.112	2.593	.010	Accepted
	H2-4	Awareness ▶ Consumers' Intentions of Use	.144	.115	1.011	.312	Rejected
H3		Consumer Perception ▶ Consumers' Intentions of Use	.359	.075	4.114	***	Accepted
H4		Consumer Perception ▶ Product Purchase Intent	.454	.099	4.768	***	Accepted
H5		Consumers' Intentions of Use ▶ Product Purchase Intent	.478	.087	4.908	***	Accepted
CMIN/DF=2.197, P=0.000, GFI=0.810, AGFI=0.764, CFI=0.888, RMR=0.042							

In a highly sophisticated and technology developed modern society, consumers are hard to know the exact operation information of the company's product liability response system. Therefore, consumers are able to achieve their objectives by utilizing corporate assessment information in the sense that it can help consumers to select correct product if the company established information using reasonable evaluation system and it can be provided to customers. In addition, providing corporate assessment information on product liability response system will positively change the consumers' recognition because it will enhance the consumers' reliability for the company. Finally, consumers' positive recognition and utilizing intention have significant influence to product purchase intention because they can use corporate information in making reasonable purchase decision.

Therefore, because consumers' intent to use are high based on the assessment criteria, to provide a measure where there are standards in which consumers make the right purchasing decisions, the government must introduce a policy to assess product liability response levels. Also, it should be possible to continuously improve the assessment criteria so that the evaluation system can be adapted to the consumer's level. The operation of this evaluation system is an effort to protect people from illegal and bad products, and members should recognized this as an important starting point emphasizing the social mission of the company to supply safe products to consumers.

It is expected that the company information required by consumers would be different for each business type because every product has its own characteristics according to its business field. However, it is the limitation of this study that characteristics by each product categories are not sufficiently considered because survey and analysis were performed for general manufacturing companies in this study. Accordingly, it will be necessary to understand the consumers' purchase intentions by business types or by product types in the future.

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