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Social distancing in retail: Influence of perceived retail crowding and self-efficacy on employees’ perceived risks

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ABSTRACT
The global COVID-19 pandemic has compelled all countries to impose social distancing as the basic epidemic prevention strategy; however, enterprises find it difficult to follow social distancing. Enterprises should give precedence to the perceived feelings of employees and manage internally to control risks. This study explores the influence of perceived retail crowding and self-efficacy regarding the perceived risk of employees in the retail industry in terms of practical social distancing. Overall, 378 valid samples were investigated using actual employees in the retail industry, and partial least squares (PLS) method was used to test the hypotheses. This study found that perceived retail crowding has a positive impact on different risk levels, while self-efficacy has a direct negative significance. For the retail industry, knowledge of these risks and employees’ perceived attitudes can be used to suggest means to maintain the service capacity of sustainable operations in retail stores.

1. Introduction

The COVID-19 virus began to spread rapidly across the world in early 2020. By September 2020, more than 33 million people were infected globally, and one million had died (World health organization, 2020). The global economy has been severely affected, and several festivals and events have been canceled or postponed, such as the Tokyo 2020 Olympic Games. The COVID-19 pandemic has forced most countries or cities to enforce several policies, such as injunctions, international entry–exit controls, and social distancing, to prevent people from going out or being in contact with others, and thus, reducing the risk of infection. Initially, Taiwan also adopted strict international entry–exit management and made it mandatory for citizens to wear masks in public places, including mass transportation to curb the spread of the epidemic, which was successful (Griffiths, 2020; BBC, 2020; Ruters, 2020). Public activities in Taiwan were gradually reopened in May 2020, allowing people to go sightseeing, shopping, and to movies, ball games, and concerts (Time, 2020). While many people ventured out and consumed again, this was a serious challenge for the retail and service industries.

Retail refers to commercial locations where a large number of people gather to buy goods. Goods can be categorized as exclusive, such as food, clothing, furniture, and books, and mixed, such as daily necessities and groceries. Some retail businesses are located in department stores, such as Selfridges, Barneys New York, and Isetan; however, as consumers are exposed to these goods on the shelves, storeowners must spend more on cleaning the store to reduce the risk of infection. Moreover, many countries have implemented social distancing as an epidemic prevention policy and several enterprises have introduced “social distance management” to reduce close interactions between people. Some retailers with small stores find it difficult to practice and manage social distancing. Researchers call it perceived retail crowding, which describes the environment of a retail store limited by space constraints, and it appears quite crowded in the presentation of goods or services (Machleit et al., 1994). These phenomena raise a concern. Given that the retail industry is a highly crowded or restricted space, COVID-19 risks faced by employees when maintaining social distancing in a crowded environment are unknown. In the current environment, employees feel unsafe and worried. However, few studies exist on this topic. In the long run, such risks would impact economic and industrial development.

Social distancing can help protect oneself from viruses. Rogers (1975) proposed that protection motivation theory (PMT) method is highly suitable for predicting and explaining why people demonstrate protective behaviors. Based on PMT, studies have explained how people protect themselves from environmental diseases (Tulloch et al., 2009; Plotnikoff et al., 2010; Barati et al., 2020). PMT is composed of two levels of appraisal: threat and coping (Rogers, 1975, 1983; Rippeto and Rogers, 1987). Threat appraisal represents the risks faced by individuals and discusses the threat factors of severity and vulnerability. Jansen et al. (2016) assumed perceived risk as representative of “threat appraisal” and found that the higher an individual’s perceived risk, the

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greater the attitudinal changes to implement specific protective behaviors. Their studies mainly focused on online self-protection. Coping appraisal refers to an individual’s response efficacy, self-efficacy, and response costs. Individuals demonstrate a self-coping attitude when faced with problems (e.g., COVID-19). From a business management perspective, it is similar to policy response. These two levels can help understand people’s motivations for protective behavior. Martens, De Wolf, and De Marez (2019) designed the PMT model based on this architecture and demonstrated the importance of threat and coping appraisal, which affects the attitude toward behavior. Coincidentally, Menard et al. (2017) proposed five main independent variables for the PMT model: threat severity, threat susceptibility, response efficacy, self-efficacy, and response cost. They are conceptually similar and consider the risks of threatening people and self-efficacy as important factors of PMT.

Marroquín et al. (2020) stated that the COVID-19 pandemic has led to anxiety among owing to social distancing, which is positively correlated with the number of infected people. This study believes that such anxiety is a risk factor and it affects the attitudes of the operators and employees in the retail industry; therefore, to deal with the subsequent academic and practical developments, it is helpful to explore the risk constructs. Maintaining the expected social distance is challenging for the retail industry. Thus, employees adopt a self-efficacy attitude in such risk situations. To confirm the existence of this relationship and discuss the difficulties in managing social distancing in the retail industry, this study explores the level of employees’ perceived risk to fill the research gap in social distancing management and empirically examines the impact of perceived retail crowding and perceived self-efficacy on employees’ perceived risk in a working environment of limited space in the retail industry.

The following sections explore the meaning of social distancing according to literature; describe the research hypotheses regarding the relationship between perceived retail crowding and perceived risk and present the research design and survey methods. Then, based on the statistical results of the collected samples, this study proposes the academic and practical implications and explores the future research directions and recommendations in the conclusions.

2. Literature review and hypotheses

2.1. Social distancing

Studies have interpreted the term “social distance” variously. Earlier, Bogardus (1922) explored racial differences and found perceived social distance between people. The study by Bogardus (1922) explained the distance between different ethnic groups and societies in the world, and interpreted perceived social distance based on the social groups’ perspective (Parrillo and Donohue, 2005). Accordingly, Heaven and Groenewald (1977) and Nowicka and Krzyzowski (2016) explored the phenomenon of social distance based on different races and languages. However, Park’s (1924, p339) results contradicted that of Bogardus (1922), in that he defined social distance as “grades and degrees of understanding and intimacy which characterize personal and social relations generally,” which explains from a perceived point of view, meaning that a distance perception not only illustrates the relationship between people but also implies the relationship between people and society. Most studies on psychology and management follow Park’s argument; for example, Krackhardt and Kilduff (1999) experimentally found that physical social distance often reflects the extent of a person’s relationships with others. In public social situations, people contact their friends first and avoid those they do not like. Several studies have focused on social distance as a reflection of the relationship of interpersonal distances. Thus, various interpretations of perceived social distance exist in the literature (Hong et al., 2017; Sung et al., 2020; Trope and Liberman, 2010). Thus, there are different interpretations of perceived social distance in literature. Specifically, it explains the degree of intimacy between people and reflects different behaviors and feedback. Broadly, it refers to the distance between a person and an organization or society and reflects class and power.

In the context of COVID-19, social distance refers to the physical distance (Centers for Disease Control and Prevention, 2020), that is, to maintain a safe measurable distance of more than 1–3 m to reduce the risk of infection. In fact, physical distance can often lead to a sense of security and comfort in public places; for example, some people want to maintain a distance from strangers and avoid being in a crowded carriage in a public bus or the mass rapid transit. Many scholars have debated the perception of personal space (Little, 1965; Sommer, 1969). Among different cultures, relationships, and environments, some believe that a narrow distance is considered infringing, whereas some are acceptable. The current social distance management also reflects this perception. Some employees are concerned about having close contacts with others and demonstrate self-protection or stressful attitudes, whereas some do not. The retail industry should be able to create and design a systematic space that not only allows consumers to have a different in-store experience but also improves service effectiveness. Moreover, physical and psychological distances are correlated, which has an interactive influence (Kent, 2007). Moreover, physical and psychological distance are correlated, which in some cases has an interactive influence. When one person dislikes another, there is a direct reaction, both physically and psychologically (Krackhardt and Kilduff, 1999; Matthews and Matlock, 2011). Won, Shriram, and Tamir (2017) stated that when an individual has a strong sense of social distance toward some things or people, they may even refuse to communicate and distrusts that person or thing. While physical distance is just a distance scale for strangers, for people who are related to each other, physical distance reflects certain psychological distance.

In the retail industry, consumers feel the need to talk to or ask for service personnel for help, or other information, thus, employees will have numerous opportunities for a close contact with consumers, which is a cause for concern for employees about the efficacy of distance management. Moreover, owing to the limitation of environmental space, many retail businesses may be unable to maintain physical distance in the workplace, which puts employees under both physical and psychological stress. Based on these considerations, this study examines retail employees and defines social distance as the distance between employees and their working environment (including consumers and other employees).

2.2. Perceived retail crowding

Stokols (1972) first proposed the concept of crowding in his study on the psychological feelings of physical distance. In a limited space, individuals generate psychological perception, meaning whether they are close to others (space), and this feeling is called perceived crowding. However, this perception has different meanings for different individuals; for example, if a person is accustomed to living in a large space and moved to a smaller space, he or she will experience the feeling of perceived crowding. Conversely, if a person resides in a very small space and moves to a very large space, there is no feeling of perceived crowding. Based on the concept of perceived crowding in the retail industry, Harrell and Hutt (1976) stated that perceived crowding is a feeling of discussing space. However, for retail stores in Tokyo, Japan, consumers are accustomed to smaller stores and do not experience perceived retail crowding, which differs from retail stores in the United States. Similar to Stokols (1972), personal background, experience, and existing environmental factors affect perceived crowding.

Perceived retail crowding means to explore the degree of crowding in a retail service environment. Machleit, Kellaris, and Eroglu (1994) categorized crowding into perceived human crowding and perceived spatial crowding. Perceived human crowding refers to the current environment in which people are in close proximity, and there is a feeling of physical crowding. A higher perceived human crowding
directly and negatively impacts consumers’ shopping satisfaction (Eroglu et al., 2005). Perceived spatial crowding refers to psychological crowding. A space perceived as insufficient leads to a feeling of crowding. Although Machleit et al. (1994) showed that the less satisfied the consumers are, in some cases such as stores with discounted prices, the crowding situation reflects the promotion situation of the industry. Machleit, Eroglu, and Mantel (2000) claimed that consumers are not influenced by crowding in promotion stores, and they have different levels of tolerance for crowding in different retail stores. Besides, some studies have proved that tourists found some amount of crowding during festivals or sightseeing activities acceptable (Zehrer and Raich, 2016). Mehta (2013) summarized the theories and stated that perceived retail crowding reflects the retail stores’ atmosphere and that this construct has different effects on satisfaction as based on the different mediating or adjusting variables. Clearly, the market environment has changed dramatically. Earlier, the retail industry only offered diversified products to consumers. However, in terms of marketing strategy and continuous competition, crowding of stores does not indicate a negative perception, meaning it is used as differentiated marketing activities to evoke different feelings in consumers and draw them to the store.

Although several studies on perceived retail crowding have focused on consumers (Mehta, 2013), only a few have focused on the employees’ perspective, thus, there was limited research on its impact and development. However, regarding retail store crowding, Esmark and Noble (2018) and Palcu et al. (2015) highlighted the importance of the relationship between employees and management. Employees can better maintain retail store cleanliness with reduced crowding. A smooth working environment improves employees’ handling and adaptability, which indirectly improved sales performance. Patten et al. (2020) and Keiningham et al. (2006) observed that employee service quality and emotional response are affected by the retail environment, and companies should plan for a safe and appropriate work environment for employees. Therefore, this construct should not be limited to investigating the performance output (customer satisfaction, customer feedback) of the retail industry, but should expand its scope of discussion to other aspects.

2.3. Perceived risk in retail crowding

Perceived risk is a popular construct in various psychological and behavioral studies. In the study of perceived risk in retail or service industries, several variables are constructed (see Table 1). Most studies on the relationship between risk and attitude, as well as its impact on intent behaviors, are empirical. Psychological risk is the most widely adopted construct. Performance risk discusses whether consumers can quickly find the goods they want to buy without wasting time. Privacy risk is a relatively new aspect observed in this study. Earlier, this construct was mainly used for online consumption behavior; however, the rise of smart retail and mobile payment applications has led to consumers’ uncertainty regarding information security of payment through digital devices in retail stores (Farshidi, 2016).

So and Nabi (2013) showed that social distancing affects an individual’s perception of sexually transmitted disease (STD) infection, and the higher the social distance (degree of intimacy), the lower the risk of STD among friends. Follmer and Jones (2017) examined whether personal anxiety helps maintain a social distancing attitude toward work. The implications of social distance are often used to explain the relationship between the avoidance of mental illness and viruses. SARS in late 2002 was a similar case in terms of the risk of virus spread. The study by Liu et al. (2005) on Taiwan classified the perceived risks arising from SARS into concern, danger, and income risk. Concern is an individual’s perception of the SARS incident, meaning individuals may be worried about SARS because of the information from TV, news, network, and friends. Danger is the fear that one might actually be at risk of death from SARS. Income means that in the case of persistent SARS, individuals’ income of may be affected. Smith (2006) observed that during the SARS pandemic, a few regular TV programs could not be broadcast as scheduled. Therefore, the entertainment and leisure industry was the first to be seriously impacted, thus severely affecting those employees. Many studies have proved that, while SARS had impeded economic development, it had helped in developing new business models or products Bennett et al. (2015); Keogh-Brown and Smith (2008); Wong (2008). It can be inferred that in the case of a virus pandemic, individuals face economic risks.

Overall, following Liu et al. (2005) and the discussion on perceived risk in the current retail industry, this study categorized employees’ risk owing to crowding into three aspects, namely, psychological, physical, and economic risk. Psychological risk refers to the feeling of unease arising from some psychological factors due to crowding, including anxiety, fear, nervousness, and other unsafe factors, which have negative psychological effects. Employees feel physical risk when they are actually exposed to some potential risk factors, such as virus, physical injury, and unsafe working environment, as they cannot maintain a social distance. Economic risk means that employees worry about possible financial losses, such as company closure, reduced working days, poor revenue, salary reduction, and other factors, which pose the risk of reduced income.

2.4. Research hypotheses

Fig. 1 shows the main framework of this study. According to earlier studies, the main framework is based on the integration of perceived retail crowding, perceived risk, and self-efficacy (protective motivation factor). Machleit, Kellaris, and Eroglu (1994) defined perceived retail crowding to explain employees’ perception of crowding in the two constructs of perceived human crowding (PHC) and perceived spatial crowding (PSC). Eroglu and Machleit (1990) stressed that overcrowding presents certain risks in consumers’ minds, and consumers might worry about having their belongings stolen when shopping. Cooray (2020) observed the relationship between perceived retail crowding and COVID-19 infection, in that greater crowding exposed consumers to greater risk. While most studies focus on consumers’ perspective, this study considers the impact of retail crowding from the employees’ perspective. Under the current social distancing management norms, overcrowding in a store results in greater perceived risk to employees. Furthermore, this study categorizes the constructs of perceived risk into psychological, physical, and economic risk, which are used to explain the risk factors of concern for employees. Therefore, the following hypothesis is proposed:

H1a. Perceived human crowding is positively associated with psychological risk.

H1b. Perceived human crowding is positively associated with physical risk.

H1c. Perceived human crowding is positively associated with economic risk.

H2a. Perceived spatial crowding is positively associated with psychological risk.

Table 1

| Study variables | Literature sources |
|-----------------|-------------------|
| Perceived risk  | Bazziem et al. (2016); Beneke et al. (2012); Beneke and Carter (2015); Diao (2012); Dus et al. (2018); Hornbrook et al. (2005); Mitchell (1998) |
| Financial risk  | Beneke et al. (2012); Sweeney et al. (1999); Hornbrook et al. (2005); Mitchell (1998) |
| Performance risk| Beneke et al. (2012); Hornbrook et al. (2005); Mitchell (1998) |
| Social risk     | Beneke et al. (2012); Bazziem et al. (2016); Mokoena and Maziriri (2017) |
H2b. Perceived spatial crowding is positively associated with physical risk.

H2c. Perceived spatial crowding is positively associated with economic risk.

When people perceive an external risk or crisis, they experience a self-protective response. From the PMT perspective, threat and coping are the motivation for people to engage in protective behaviors (Rogers, 1975; Rippetoe and Roger, 1987). Many empirical studies have used self-efficacy as a representative of the personal coping attitude, which affects individuals’ self-protection behaviors (Ifinedo, 2012; Tu et al., 2015; Boss et al., 2015). Bandura (1977) proposed self-efficacy as a concept in which individuals implement or protect their response behavior to achieve specific goals resulting from the change of task requirements and environment. Increased self-efficacy leads to greater effort and higher persistence. Therefore, this study believes that employees should protect themselves in a crowded working environment, which prevents the feeling of increased external threats. To prevent heart diseases, Rimal (2001) indicated that self-efficacy also increases when people have sufficient risk awareness. Kim and Kim (2015) and Luo et al. (2010) showed that a negative correlation exists between self-efficacy and perceived risk and that self-efficacy reduces the uncertainty faced by individuals. Schwarz (1992) pointed out that self-efficacy is an important theory to explore people’s behaviors in health protection and explains employees’ social distance management as a representation of self-protection; therefore, the following hypotheses is proposed:

H3a. Self-efficacy is negatively associated with psychological risk.

H3b. Self-efficacy is negatively associated with physical risk.

H3c. Self-efficacy is negatively associated with economic risk.

3. Research method

3.1. Measures and data collection

The questionnaire used in this study is mainly divided into the basic personal background and the scale to measure variables. The variable scale uses a 7-point Likert scale, where 1 indicates highly disagree and 7 indicates very much agree, to reflect the subjects’ perceptions. The questions mainly refer to the scales used in earlier studies and the contents are appropriately adjusted to conform to the subjects surveyed. See section Appendix A for the summary.

Perceived crowding is indicated by the sum of the scores of each question. The concept of psychological risk follows the study by Dholakia (2001), and it is found suitable for exploring the psychological perception of distance. Theoretically, physical risk of employees’ work environment is a vast topic because different industries have different occupational threats. According to Tkaczynski et al. (2017), the questions of physical risk are summarized as hygiene, illness, and disability. Accordingly, and following Fuchs and Reichel (2006) and Quintal and Phau (2014), this study adapted some of their statements into questions for physical risk. Economic risk is based on the questions by Sweeney et al. (1999) and Tseng and Wang (2016), while the questions on self-efficacy by Herath and Rao (2009) are cited as the measurement questions. In addition, considering that the original questionnaire is in English, the text was translated into Chinese. After a pilot survey of two university professors and five students, the questionnaire was revised to design the formal questionnaire.

Questionnaires were collected mainly through seminars, work studies, advocacy in the retail industry and the respondents were all employees, supervisors, or related personnel in the retail industry. The study sample includes convenience stores, supermarkets, grocery stores, drug stores, and apparel stores, and most of the retail service areas are located in Taiwan’s second-tier city. The survey was conducted between April and July 2020. After excluding those with wrong responses, 378 valid samples were recovered. Smart PLS tool was used for data analysis, which provides path analysis for examining multiple paths and routes and is popular software used to validate models in various disciplines (Hair et al., 2017). In this study, PLS path modeling was used to test the hypotheses and explanatory power of the variables. The samples were simulated during calculation, and bootstrap replications were set to 5000.

3.2. Assessment of the measurement model

According to the demographic data (see Table 2), most of the sample consisted of women (61%) and a majority were single (82%). Most (46%) of the respondents were aged between 21 and 30 years, followed by many (29%) younger than 20 years, while only 6% were older than 50 years. In terms of educational background, majority (43%) were college students, followed by high school students (36%). The general seniority ranged from 7 to 12 months (37%), and majority (95%) of the employees in the overall sample were employed for less than 3 years.

Cronbach’s alpha was used to check the internal consistency. Table 3 shows that the reliability of the research questions is 0.848 for perceived human crowding, 0.820 for perceived spatial crowding, and 0.862 for self-efficacy, and the risk dimensions are all greater than 0.8. As these figures are above 0.7 (Fornell and Larcker, 1981), which meet the standard threshold criterion for reliability. The average variance
correlated. Finally, the constructs have good reliability and convergent validity.

According to Hair et al. (2016), the variance inflation factor (VIF) was calculated before verifying the results. Perceived retail crowding and self-efficacy were separately observed as predictors of perceived risk to determine whether VIF met the recommendation below 3.0 (Johnson and Lebrion, 2004), and the results show that both meet the standard with a maximum value of 1.353; thus, there is no collinearity problem. Table 6 shows the analysis results of the hypotheses. The statistical results of H1a reach a significant level ($\beta = 0.119, p < 0.05$), indicating that perceived human crowding has an impact on psychological risk. The regression coefficients of H1b and H1c are also positive and the $p$-values are less than 0.001; thus, perceived human crowding also has a positive effect on physical and economic risk. The verification results of hypotheses H2a H2c are supported. When perceived spatial crowding is increased, individuals’ feelings in psychological, physical, and economic risk also increased. It is observed that hypotheses H3a H3b are all supported, and the effect of self-efficacy on perceived risk is negatively correlated. Finally, $R^2$ was used to evaluate the explanatory power of the structural model (Hair et al., 2011). The $R^2$ of individual construct in the risk level separately are 0.511 (PscR), 0.492 (PhsR), and 0.498 (EconR), respectively; thus, the hypothesis verification results have good explanatory power.

### 4.2. Discussion of findings

Several studies have underlined that social distancing has

| Construct | Mean (S.D.) | Factor loading | Cronbach’s alpha | Composite reliability (CR) | AVE |
|-----------|-------------|----------------|------------------|-----------------------------|-----|
| Perceived human crowding (PHC) | | | | | |
| PHC1 | 4.94 (0.75) | 0.868 | 0.848 | 0.898 | 0.687 |
| PHC2 | 4.80 (0.76) | 0.830 | | | |
| PHC3 | 4.57 (0.81) | 0.789 | | | |
| PHC4 | 5.14 (0.72) | 0.827 | | | |
| Perceived spatial crowding (PSC) | | | | | |
| PSC1 | 4.88 (0.73) | 0.871 | 0.820 | 0.892 | 0.735 |
| PSC2 | 4.84 (0.79) | 0.896 | | | |
| PSC3 | 4.88 (0.77) | 0.802 | | | |
| Self-efficacy (SE) | | | | | |
| SE1 | 6.63 (0.49) | 0.879 | 0.862 | 0.915 | 0.783 |
| SE2 | 6.66 (0.58) | 0.889 | | | |
| SE3 | 6.65 (0.49) | 0.887 | | | |
| Psychological risk (PscR) | | | | | |
| PscR1 | 4.85 (0.85) | 0.901 | 0.916 | 0.941 | 0.799 |
| PscR2 | 4.82 (0.84) | 0.905 | | | |
| PscR3 | 4.75 (0.86) | 0.917 | | | |
| PscR4 | 4.84 (0.82) | 0.850 | | | |
| Physical risk (PhsR) | | | | | |
| PhsR1 | 4.45 (0.83) | 0.774 | 0.838 | 0.891 | 0.672 |
| PhsR2 | 4.74 (0.74) | 0.820 | | | |
| PhsR3 | 4.53 (0.85) | 0.862 | | | |
| PhsR4 | 4.60 (0.87) | 0.821 | | | |
| Economic risk (EconR) | | | | | |
| EconR1 | 4.68 (0.78) | 0.869 | 0.842 | 0.905 | 0.760 |
| EconR2 | 4.88 (0.77) | 0.896 | | | |
| EconR3 | 4.77 (0.85) | 0.850 | | | |

### 4.1. Verification of the hypotheses

According to Hair et al. (2016), the variance inflation factor (VIF) was calculated before verifying the results. Perceived retail crowding and self-efficacy were separately observed as predictors of perceived risk to determine whether VIF met the recommendation below 3.0 (Johnson and Lebrion, 2004), and the results show that both meet the standard with a maximum value of 1.353; thus, there is no collinearity problem. Table 6 shows the analysis results of the hypotheses. The statistical results of H1a reach a significant level ($\beta = 0.119, p < 0.05$), indicating that perceived human crowding has an impact on psychological risk. The regression coefficients of H1b and H1c are also positive and the $p$-values are less than 0.001; thus, perceived human crowding also has a positive effect on physical and economic risk. The verification results of hypotheses H2a H2c are supported. When perceived spatial crowding is increased, individuals’ feelings in psychological, physical, and economic risk also increased. It is observed that hypotheses H3a H3b are all supported, and the effect of self-efficacy on perceived risk is negatively correlated. Finally, $R^2$ was used to evaluate the explanatory power of the structural model (Hair et al., 2011). The $R^2$ of individual construct in the risk level separately are 0.511 (PscR), 0.492 (PhsR), and 0.498 (EconR), respectively; thus, the hypothesis verification results have good explanatory power.
psychological effects on individuals, and the most common effects are anxiety or unease (Li and Wang, 2020; Marroquín et al., 2020; Zhang and Ma, 2020). This issue should be addressed by business management. As most consumers are bound indoors, they are buying products from a website and venture out less frequently. Service, catering, and retailers are facing considerable challenges. Environment and social distance have become important for developing management strategies in these industries. This study examines retail employees and explores their psychological perceptions, and addresses the research gap on perceived retail crowding from the employees’ perspective.

Whether for physical or spatial crowding, the results show that employees’ perceptions have considerable impact on perceived risk. Regarding the degree of impact, employees’ perceived spatial crowding has a higher impact on psychological and physical risk. As the degree of perceived spatial crowding was affected by personal experience and background, to reduce the employees’ anxiety, their perceptions of physical space should be improved first. Besides, employees worry about financial issues regarding personal income, but not more than the concerns about other risks because crowded retail stores are usually associated large benefits to the store owners; therefore, there is less concern about economic risk. However, employees may still lose personal income owing to shift reductions, shutdowns, and other factors.

This study found that the highest perceived risk of employees comes from crowding of their own stores. As self-efficacy negatively affects the formation of risks, the retail industry should dynamically adjust their store interiors to adapt to the rapidly changing environmental conditions. In the practice of distance management, enterprises should consider employees’ psychological and physical risk for effective distance management.

### 4.3. Implications for research

Several studies in the retail industry focus on improving consumers’ purchase intention and satisfaction. With the help of promotions, e-commerce, or IT applications, retailers can realize profits through creative marketing solutions. However, in a service environment where social distancing is practiced, various problems, such as poor service and operational stagnation, are likely to occur. With increasing consumer awareness of pandemics and public health, enterprises should rethink important environment management programs, starting from internal environments and employee management. At present, the retail industry practices social distancing from the consumers’ perspective, while, in fact, the employees should be the top priority. This study explores the impact of perceived crowding on employees, which can be a supplement to current academic research on this topic and a basis for future academic development.

This study used perceived retail crowding and self-efficacy to explore the impact on employees’ risk perception. Perceived retail crowding is further divided into perceived human crowding and perceived spatial crowding, which explain the level of perceived risk. From perceived human crowding perspective, when the distance between people is lesser, there is uncertainty of direct physical worry, which impacts greater than the degree of psychological risk. Employees actually attach great importance to the safety of physical distancing, which implies that it is important to implement social distancing measures to reduce the risk of infection and improve employees’ perceived risk in the work environment. Retailers improve their environment is also ensuring consumers’ safety and health. A safe working environment for retail employees improves the company’s performance, it also ensuring consumers’ safety and health.

From the perspective of self-efficacy, this study verified the negative effects on all three risk aspects in this construct. Earlier, Kim and Kimv (2015) and Luo et al. (2010) only examined the effect on perceived risk, while this study examines the perceived risk construct in detail. In future studies, the interference of other emotional factors can be considered to understand the moderating effect of this construct in the face of different risk perceptions. Finally, this empirical study found that physical, psychological, and economic risk are the main risk factors that employees may experience as enterprises continue to implement social distance management. As enterprises find it difficult to improve the severity of the physical risk, they should integrate different theories to propose a model that reduces perceived physical risk.

### 4.4. Implications for practice

Considering the various levels of individual’s perceived crowding, there are predictive results for psychological, physical, and economic risk. Therefore, retail managers should improve the working environment and take corresponding measures for store environmental management. At the physical level, the decline of the workplace affects the employees’ attitude and they worry about losing their jobs, which in turn leads to poor work performance. To improve employees’ service safety, managers should reconsider the flow of people and arrangement of goods, reduce employees’ direct and close contact with customers through rigorous planning, and provide protection tools for employees’ safety and peace of mind. Considering there are any potential outbreaks, pandemics, or disruptions to social life, it is imperative to limit the number of customers entering the store. It is necessary to implement the real-name system for customers and undertake frequent sanitizing and disinfection to protect employees and customers. At the psychological level, as employees are concerned about the crowded environment, employees must be provided with comfortable workplace. Besides good management of physical distancing, employees should be given psychological compensation or protection, such as a pay increase during peak hours of serving a large number of customers, and through reduction of shift and salary adjustments to ensure the retention of employees. Economic losses cannot be avoided, hence managers should emphasize communicating with employees and encourage them to purchase goods in their own store so that the company can operate smoothly under difficult circumstances.

The results showed that H3a H3b are supported. Although self-efficacy reduces employees’ perceived risk, from prevention perspective, because employees are aware of the need for additional protection, and most of them take preventive actions (e.g., wear masks, frequent hand washing, and using alcohol for cleaning). However, not all employees have such perception and may have different feelings about distance or crowding, which is similar to the Stokols’ perspective (1972). To enhance their self-protection awareness, enterprises should educate and guide their employees. Moreover, Ortega-García et al. (2020) emphasized that while the social distancing measures among Spanish health care workers to protect against COVID-19 was protective in the early stages, additional protective devices were required later on. The support system became even more important, as it allowed health care workers to take care of patients more confidently. Therefore, this study suggests that, in addition to the practice of social distance management, the retail industry should provide more protection tools (e.g., mask, sanitary gloves, hydro-alcoholic gel) to employees for further protection to support their awareness of self-efficacy and practice.

### Table 6

The assessment of relationships among the constructs.

| Path                  | Beta (β) | T-statistics | p-values | Result     |
|-----------------------|----------|--------------|----------|------------|
| H1a: PHC → PscR  | 0.119    | 2.545        | 0.011    | Supported  |
| H1b: PHC → PhsR | 0.323    | 5.740        | ***      | Supported  |
| H1c: PHC → EconR | 0.210    | 4.935        | ***      | Supported  |
| H2a: Psc → PscR  | 0.442    | 9.225        | ***      | Supported  |
| H2b: Psc → PhsR | 0.364    | 7.775        | ***      | Supported  |
| H2c: Psc → EconR | 0.115    | 2.497        | 0.013    | Supported  |
| H3a: SE → PscR  | 0.324    | 7.835        | ***      | Supported  |
| H3b: SE → PhsR | −0.205   | 4.796        | ***      | Supported  |
| H3c: SE → EconR | −0.529   | 14.189       | ***      | Supported  |

***p < 0.001.
self-protection behaviors, which can also build consumers satisfaction and safety.

COVID-19 has forced several retail and service industries to change their operation times and modes of management. Enterprises should firmly establish their health and environment management systems and develop new systems for managing a safe environment for smooth operations. At present, enterprises are still in the initial stage of practicing social distance management and safe service processes, and other solutions should be designed for different industry activities. In the future, enterprises may not value the implementation of social distance management because of a safe and virus-free environment. In the long term, the research results should help maintain sustainable and stable operations, which is an important foundation to support social distance management.

5. Conclusions, limitations and future research

This study shows that perceived retail crowding exists in employees’ perception, which affects improvement of employees’ risk awareness, and self-efficacy can reduce the risk perception. This study offers practical suggestions to employees and environmental management. In terms of academic suggestions, this study considers employees’ perspective; however, different occupations in the service field have different impacts on employees’ risks; for example, the catering service industry often faces risks close contacts due to numerous customers. Future studies can propose different hypotheses on implementing social distancing and health management for different types of service industries.

This study focused on perceived retail crowding to explore employee feelings. According to these results, researchers may focus other a theoretical framework to confirm whether the customer is suitable for this study. Given that consumers buy items in retail stores, several emotional factors, such as various brands, prices, services, and shopping experience, directly or indirectly affect their perception of risk. Future research could analyze comprehensive points of view depending on different theories.

Palomino et al. (2020) observed that the economic consequences of social distancing in Europe resulted in serious financial losses, which brought considerable challenges to future economic risks. Although several studies have explored the impact of COVID-19 on economic development, it is still early to explore the implications of the current epidemic prevention management measures on enterprise implementation. Papadopoulos, Baltas, and Bali (2020) suggested from the perspective of digital technology that enterprises can create a more comfortable work or consumption environment by implementing new management systems and procedures. Therefore, both academic and practical development studies can explain the thinking behind the application of business management based on different perspectives.

This study has the following resource constraints: (1) This study used purpose sampling to conduct a questionnaire survey of activities in the retail industry; thus, most of the respondents were grassroots employees. Besides, they were not classified according to the same retailers; therefore, some respondents may be employed by the same retailers, but serve in different stores. (2) The factors affecting perceived crowding are limited by personal experience and background. This study did not include personal experience, emotion, or other factors. Moreover, the actual spaces of the retail stores served by the respondents were not investigated; thus, the size of the retail stores could not be estimated. (3) This study is limited to Taiwan, and the survey samples are mainly retail stores, such as convenience stores, supermarkets, grocery stores, drug stores, and apparel stores. Further studies are needed to confirm whether its experience can be applied to other stores or countries or in cross-cultural regions.

Appendix A. Measurement items

| Perceived human crowding (PHC) |
|--------------------------------|
| 1. My work environment is always crowded. |
| 2. There are many members in my work environment. |
| 3. My work environment is very crowded for me. |
| 4. It is easy to be contact with people physically in my work environment. |
| **Perceived spatial crowding (PSC)** |
| 1. My work environment makes me feel that there is not enough space. |
| 2. My work environment makes me feel constrained. |
| 3. I always find it inconvenient to move around in my work environment. |
| **Self-efficacy (SE)** |
| 1. I would feel comfortable following most of the protection policies on my own. |
| 2. I could easily follow protection policies on my own. |
| 3. I would be able to follow most of the protection policies even if there was no one around to help me. |

| Psychological risk (PscR) |
|--------------------------|
| 1. When I come into close contact with others, I feel nervous. |
| 2. When I come into close contact with others, I feel uncomfortable. |
| 3. It is easy for me to feel anxious when I am in close contact with others. |
| 4. The distance of contact with people is a risk to me. |

| Physical risk (PhsR) |
|---------------------|
| 1. In the workplace, I would worry about safe distance. |
| 2. I would worry about the possibility of infectious disease. |
| 3. If I have physical contact with other people, I worry about physical danger or injury. |
| 4. I will be worried that my behavior or hygiene habits are not appropriate, and that I will be hurt. |

| Economic risk (EconR) |
|-----------------------|
| 1. Under the constant management of social distance, I worry that I have insufficient income. |
| 2. Under the constant management of social distance, I’m worried that I might lose my job or stop working. |
| 3. Under the constant management of social distance, I’m afraid I’ll lose money or time. |
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