Effect of cooperative structures on risk-taking and innovativeness

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Abstract

This study examines the effect of cooperative structures on risk-taking and innovativeness. The cooperative structures include the size of the board, assets, and membership. The researcher utilized a survey research design. The purposive sampling method was used to gather information from 78 cooperatives that were selected using inclusion criteria- in existence for more than ten years. Partial least squares structural equation modeling (PLS-SEM) was used to analyze the data. The findings reveal that the cooperatives have a five-member board, members of less than 500, and belong to small-type cooperatives. The study also found that the cooperative practiced risk-taking and innovativeness to a great extent. In testing the effect of cooperative structures on risk-taking and innovativeness, data analysis revealed that only one significant effect was noted. The study found that the size of the cooperative membership has a negative and significant effect on innovativeness. Being the ultimate decision maker of the cooperative, the member exercised their right during the annual general membership. The researcher recommends that the cooperative consider determining the optimal number of members who can participate in the decision-making body by classifying the members into regular- those who have the right to vote- and associate -those who do not have the right to vote.

***Keywords*:** Cooperative Traits, Cooperative Size Entrepreneurial Traits, Risk Aversion, Members Participation

JEL Classification Codes: A00, L25, P13

1. Introduction

Cooperatives are autonomous associations formed by individuals who willingly join forces to collectively pursue their mutual economic, social, and cultural goals in a unified manner (Ghauri et al., 2022). Cooperatives are influenced by organized democracies that engage in professional endeavors (Iliopoulos & Valentinov, 2022). In a cooperative, every member has the democratic responsibility to achieve an agreement with the other members about the activities to be undertaken. This is in contrast to having a standardized leadership or departments, as explained by Rey and Tirole (2007). Like businesses, cooperatives share earnings with their members and welcome new members as long as they support the cooperative's founding goals in terms of the economy, society, and culture (Chungyas & Trinidad, 2022).

Cooperatives are owned and managed by the members who purchase and use their goods and services, creating an organic relationship between members and management (Bretos & Marcuello, 2017). The ultimate decision-making of every cooperative lies on them during the annual general membership assembly. During the meeting, the board laid down all the development plans and programs and the needed budget for their implementations while the general members approved or disapproved it.

The size of cooperative organizations is an important variable affecting how they function and accomplish (Arcas et al., 2011). A cooperative's ability to engage in innovative activities and efficiently manage risks can be strongly impacted by its size, whether measured in terms of membership, assets, or board. According to Guest (2009), higher board sizes have a detrimental influence on business performance, suggesting that issues with communication and decision-making may hinder the efficacy of the boards. According to Cheng's (2008) research, there is a negative correlation between the board size and the level of variability in corporate performance. This implies that bigger boards are more likely to make choices that involve compromise.

When cooperatives expand their activities to service broader audiences or markets, they face new challenges and opportunities. A cooperative's ability to embrace these requires innovative thinking and at the same time entering into risk-taking activities. The membership and operations of the board have a significant influence on successful risk management, as well as strategic direction and decision-making processes (Sierra-Morán et al., 2021).

Meanwhile, Hakovirta et al. (2020) pointed out that the firm size and function of the board, including other board characteristics, impact performance have been studied well. However, its impact on risk-taking and firm innovativeness has not yet been studied in depth (Sierra-

Morán et al., 2021). Similarly, few studies investigated the association of the size of the cooperative and its board size to risk-taking and innovativeness (Chumba, 2015; Wang, 2012). Huang & Wang (2015).

Hence, this paper aims to investigate the cooperatives' risk-taking and innovative practices, including their board size and the size of assets and membership. The paper also aims to investigate the effect of board size and cooperative size on risk-taking and innovativeness.

2.0 Literature Review and Hypothesis Development

2.1 Effect of Board Size on Risk-Taking and Innovativeness

Taking risks is potentially beneficial in business only if the firm is willing to take on more risk in exchange for bigger rewards. Cooperatives, as commercial enterprises, cannot escape dangerous circumstances, but this does not imply that they should embark on a new venture with which they are unfamiliar. The board of directors, as the representative body of the members, formulates long-term development plans that fulfill the needs of the membership and guarantee the financial sustainability of the cooperative. The board of directors is responsible for establishing a business climate that maintains an appropriate degree of risk for the cooperatives. It is believed that the recent business collapse was caused mostly by companies taking on too much risk. That is why the board's responsibility in risk management must be clearly defined (Ishak & Nor, 2017). Assigning board risk responsibilities may have a substantial impact on the implementation of board risk management protocols (Ittner & Keusch, 2015).

The size of the cooperative's board may impact its risk-taking tendencies. Research has revealed that board size has a considerable negative influence on risk-taking willingness (Chumba, 2015; Wang, 2012). Huang and Wang (2015) also claimed that businesses with smaller boards are more likely to follow riskier investment methods. Additionally, according to Wang (2012), organizations with smaller boards use less debt but make riskier investments. Likewise, Wang and Hsu (2013) discovered that board size may impact risk-taking. They proposed that businesses with more independent directors are less likely to incur external risk, but a board with a more diverse membership may undermine the board's supervision role. These studies revealed that smaller boards are connected with increased future risk.

Research on banking institutions has shown that having a high board size has a detrimental and noteworthy effect on the loan portfolio at risk and default in financial institutions (Abdulai et al., 2020). However, several studies indicate that having a high number of board

members might lead to increased expenses and challenges related to individuals benefiting from the work of others without contributing themselves. Furthermore, it can also complicate the decision-making process and make it harder to schedule and conduct frequent meetings, assuming all other factors remain constant (Olayiwola, 2018; Shahwan, 2015). It is widely believed that bigger boards lead to lower firm performance. This is because it is more challenging and costly to have good communication, task coordination, and decision-making among a bigger group of individuals compared to smaller ones (Nyamongo & Temesgen, 2013).

H_1 Risk-taking is negatively affected by the cooperative's board size.

In order to endure, cooperatives must be able to adjust and develop. The cooperative's success hinges on the board's capacity to devise inventive resolutions for the challenges and requirements of its members. This research also assessed if board size may impact the level of innovation inside the cooperative. The findings of the research conducted by Gonzales-Bustos et al. (2020), corroborated a substantial positive correlation between innovativeness and board size.

Sierra-Moran et al. (2021) found that the proportion of directors is significantly correlated with firms' innovations. However, the strength of these connections varies depending on the metrics of innovation used. In their study, Zhao et al. (2022) discovered a strong and positive association between board size and the promotion of green innovation. They emphasized that board members who are of a greater stature may provide valuable resources and help in terms of expertise. Companies that have a strong focus on innovation tend to recruit directors who possess specialized expertise (Allemand et al., 2017). Innovative organizations benefit from several kinds of innovation, each of which requires directors with certain profiles. These profiles serve as benchmarks for determining the criteria for board appointments (Allemand et al., 2017).

H_2 Innovativeness is positively affected by the cooperative's board size.

2.2. Effect of Cooperative Size on Risk-Taking and Innovativeness

The key to achieving success in a cooperative is in the active involvement of its members, particularly in the areas of economics and governance. Considering membership while deciding the best course of action may increase the likelihood of achieving corporate success. Nevertheless, Bareille et al. (2016) contended that the level of engagement among members diminishes as cooperatives expand in size.

Cooperatives are established according to the principles of self-reliance and accountability. These ideals position cooperatives as a collective unit comprised of members who need nurturing and support. Cooperatives can mitigate output risk, pricing risk, and other agricultural concerns. Ligon (2009) asserts that cooperatives, particularly those involved in agricultural endeavors, may significantly contribute to helping their members in risk management. One way to do this is by aggregating sales across different periods and locations to mitigate price volatility. Furthermore, Molla et al (2019) said that being a cooperative member provides a substantial benefit in reducing production risk.

Gander (2012) researched the "debt structure, size, and risk volatility of US industrial enterprises". The study revealed an association between company size and risk-taking behavior. He emphasized that when the scale of a corporation grows, the level of volatility decreases. Various research has shown a link between risk-taking and participation in a cooperative when examining the impact of cooperative size (Ligon, 2009; Nmadu et al., 2012; Salimonu & Falusi, 2009).

H_3 Risk-taking is affected by the cooperative's asset size.

H_4 Risk-taking is affected by the cooperative's membership size.

The size of the cooperative may greatly impact its operational capacity. Cooperatives of a larger scale often possess a greater abundance of resources, including assets and members. Typically, bigger cooperatives tend to have a greater variety of skills and perspectives among its members, which creates an atmosphere that is favorable for creating new ideas. The innovativeness of a cooperative is influenced by its size, and the existence of cooperatives enhances the innovativeness of its members (Giannakas & Futton, 2005).

Different studies have shown contradictory outcomes regarding the impact of business or cooperative size on innovation. In their study, Marom et al. (2019) investigated the relationship between business size and entrepreneurial strategy. They found that bigger organizations are more inclined to adopt strategies that prioritize greater levels of innovation but involve lower levels of risk. In contrast, smaller companies often choose riskier but less innovative tactics.

However, in the context of cooperatives, Rogers (2004) found a direct effect of the quantity of cooperative membership on the level of innovativeness. Larger cooperatives often demonstrate greater levels of creativity. Nevertheless, it is crucial to acknowledge that not all research are in agreement with this. Chindasombatcharoen et al. (2022) and Shefer & Frenkel (2005) presented a contrasting viewpoint. It is suggested that the scale of a corporation, even a cooperative, may have a negative link with creativity.

H_5 Innovativeness is negatively affected by the cooperative's asset size

H_6 Innovativeness is negatively affected by the cooperative's membership size

3. Methodology

This study used a descriptive survey research methodology to examine the level of risk-taking and creative activities among cooperatives in Occidental Mindoro. The participants for this research were selected using a purposive sampling approach. The sample comprises 78 cooperatives that have a tenure of over 10 years. The sample size was calculated using the method used by Bonett and Wright (2000).

Data was collected by the administration of a questionnaire. To ensure that the respondents could understand, the respondents were given a concise explanation. The survey used a five-point Likert scale, with a range from one (indicating severe disagreement) to five (indicating strong agreement), to assess the degree of agreement or disagreement with the statement. The questionnaire included five items to assess risk-taking and five statements to assess innovativeness. The questionnaire furthermore includes a clarification on the objective of the survey, as well as a declaration seeking consent to use the data in compliance with data privacy legislation.

The questionnaire was sent using both online surveys and traditional paper and pen techniques. The survey questionnaire was sent to the group chats of the cooperative federation. There were 44 replies produced from the online survey. Meanwhile, hard copies of the survey questionnaire were sent to cooperatives at their seminars and general assembly meetings, resulting in 34 replies.

The data gathered was inputted into MS Excel and analyzed using SMARTPLS version 4.0.9.6. The data was analyzed using partial least squares structural equation modeling (PLS-SEM).

4. Data Analysis

4.1. Profile of the cooperatives

The survey results indicate that the board consists of five directors (67.5%), seven directors (24.7%), and nine directors (7.8%). The findings indicate that cooperatives have a distribution of members, with 36.4% having fewer than 100 members, 36.4% having 100-500 members, and 27.2% having more than 500 members. Moreover, a significant proportion of the cooperatives fall into the category of small enterprises (39%), with a smaller percentage being classified as micro (20.8%), medium (33.8%), and big (6.4%) enterprises.

The Cooperative Development Authority in the Philippines categorizes cooperatives into four distinct classifications based on their size - micro, small, medium, and big. The classification of cooperative is based on their asset size. Micro cooperatives have assets of up to three million pesos, small cooperatives have assets ranging from three to fifteeb million pesos, medium cooperatives have assets ranging from 15 to 100 million pesos, and large cooperatives have assets above 100 million pesos (Launio & Sotelo, 2021).

4.2. Descriptive analysis

Cooperatives have a unique approach to risk-taking because of their collaborative structure, ideals, and dedication to long-term growth. By sharing risks among members, operating in accordance with cooperative values, and emphasizing long-term sustainability, these entities demonstrate the promise of a distinct paradigm for economic success that combines risk-taking with communal well-being.

The survey results show that finding new opportunities is one of the most practiced by the cooperatives in their risk-taking endeavors (mean=4.36, SD=0.63). The cooperatives even experimented with their product and services to obtain a good profit and provide better services to their members. They also practiced taking higher risks for higher returns (mean=3.84, SD=0.90) and did not avoid any risky situation (mean=3.86, SD=0.87). In general, the cooperative practiced risk-taking with an overall mean of 3.81 (SD=0.65)

Innovative practices are vital for the success and sustainability of cooperatives, which are member-owned and driven organizations operating in various sectors. Through adopting innovative approaches, cooperatives can enhance efficiency, and productivity, adapt to changing needs, member engagement, financial sustainability, and community development, Further, by fostering a culture of innovation, cooperatives can navigate challenges, seize opportunities, and create lasting value for their members and the communities they serve. By embracing these practices, cooperatives can stay relevant and sustainable over time.

In addition, results indicate that the cooperative practiced innovation to a great extent in managing their affairs (mean=4.02, SD=0.66). The findings revealed that cooperatives get more satisfaction when they have new ideas (mean=4.16, SD=0.80) and they like projects that require the ability to innovate (mean=4.01, SD= 0.77) and creative thinking (mean=4.00, SD=0.79). The primary objective of the cooperatives is to serve the needs of its members. Giving satisfactory services to members is meant to achieve this objective. The cooperatives believe that innovating their services will give them assurance of members' satisfaction and continued patronage and loyalty to the organization.

4.3. Internal Consistency Reliability

Convergent legitimacy may be defined as the level of consensus across many indicators when assessing the same concept (Sarstedt et al., 2014). The Average Variance Extracted (AVE) quantifies the extent to which the construct or latent variables can account for the average variability in the items. It is often used to evaluate discriminant validity. The AVE rule of thumb states that the "positive square root of the Average Variance Extracted (AVE) for each latent variable should exceed the strongest correlation with any other latent variable (Sarstedt et al., 2014)". The AVE (Average Variance Extracted) for risk-taking is 0.49, whereas the AVE for innovativeness is 0.490.

Composite reliability assesses the degree of internal consistency among the indicator variables that load on the latent variable. Sarstedt et al. (2014) propose that for investigative research to be deemed adequate, the composite dependability should fall within the range of 0.60 to 0.70. The findings of the typical PLS technique for this research reveal that the latent variable in the model has a composite reliability. The composite reliability for risk-taking is 0.764 and for innovativeness is 0.937. These values are higher than the estimated range of 0.60 to 0.70 reported by Hair et al. (2013). Subsequently, the Cronbach's alpha coefficient for the two variables exceeds 0.70, indicating that the two constructs exhibit a high level of dependability.

Table 1. Summary of Measurement Model Results

Construct	Items	Factor Loading	AVE	Composite Reliability	Cronbach's Alpha
Risk Taking	Risk Taking 1	0.675	0.490	0.764	0.808
	Risk Taking 2	0.486			
	Risk Taking 3	0.890			
	Risk Taking 4	0.930			
	Risk Taking 5	0.317			
Innovativeness	Innov1	0.708	0.722	0.937	0.903
	Innov2	0.882			
	Innov3	0.911			
	Innov4	0.900			
	Innov5	0.830			

Source: SmartPLS version 4.0 Output, 2023.

4.4. Discriminant Validity

Discriminant validity measures the degree to which several notions or variables are separate from one another (Hubley, 2014). The statement suggests that the degree to which indicators distinguish the construct they are linked to from other constructs in the model is being referred to (Sarstedt et al., 2014). It evaluates the extent to which a measuring instrument accurately captures the specific qualities of the constructs it aims to measure, without mixing them up with other similar but separate constructs. The Fornell and Larcker (1981) criteria is the most conservative criterion suggested for assessing discriminant validity. The criteria assess the AVE value of each construct by comparing it with the squared inter-construct correlation of that construct with all other constructs in the structural model. Table 2 demonstrates that the measures of innovativeness (0.850) and risk-taking (0.70) satisfy the criteria set by Fornell & Larcker. This indicates that the discriminant validity of the constructs is satisfactory since the square root of the Average Variance Extracted (AVE) for each construct is greater than the correlations with the residual constructs in the model.

Table 2. Discriminant Validity using Fornell & Larcker Criterion

Construct	Innovativeness	Risk Taking
Innovativeness	0.850	
Risk Taking	0.562	0.70

Source: SmartPLS version 4.0 Output, 2023.

The cross-loading criteria is seen as a more inclusive method for evaluating the validity of discrimination (Hair et al., 2011). According to Chin (1988), the indications of external load on a construct should be better than its loadings on other constructions.

Table 3. Cross Loading

Items	Innovativeness	Risk Taking
Innov1	**0.708**	0.282
Innov2	**0.882**	0.493
Innov3	**0.911**	0.495
Innov4	**0.900**	0.408
Innov5	**0.830**	0.683
Risk Taking 1	0.548	**0.675**
Risk Taking 2	0.234	**0.486**
Risk Taking 3	0.431	**0.890**
Risk Taking 4	0.527	**0.930**
Risk Taking 5	0.594	**0.317**

Source: SmartPLS version 4.0.9.6 Output, 2023

4.5. Structural Model Test

Figure 1 displays the outcomes of the modeling hypothesis used to investigate this matter. It presents the coefficients directly associated with the variables, which are 0.224, 0.139, -0.087, -0.359, -0.198, and -0.065.

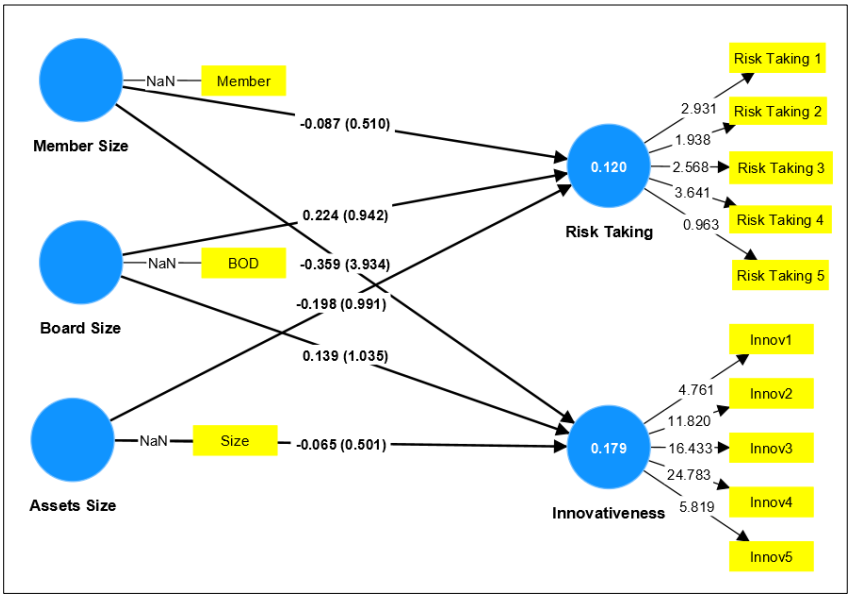

Figure 1. Structural equation model
Source: SmartPLS version 4.0.9.6 Output, 2023

4.6. Test of Hypothesis

The hypothesis was tested using the SmartPLS statistical platform version 4.0.9.6, which used partial least square-structural equation modeling (PLS-SEM). Partial Least Squares Structural Equation Modeling (PLS-SEM). The research used the PLS method, which is particularly suitable for predicting effects. Bootstrapping was employed to quantify the significance level of the predictions while blinding was used to assess the model's forecasting capability. The board size, asset size, and membership size are considered independent factors, whereas risk-taking and innovativeness are considered dependent variables.

The hypothesis testing conducted to figure out the effect of asset size on innovativeness (H1) yielded a t-statistic of 0.512 (p-value=0.309), which caused the hypothesis to be rejected. The hypothesis test examining the relationship between asset size and risk-taking (H2) yields a t-statistic of 0.991 (with a p-value of 0.162), heading to the denial of the assumption. After conducting a test to examine the relationship between asset size and risk-taking (H3), the results showed a t-statistic of 1.035 and a p-value of 0.162. Based on these findings, we may reject H3. In addition, when examining the relationship between membership size and risk-taking (H4), the hypothesis was rejected based on a t-statistic of 0.510 (p-value 0.306). In

addition, the hypothesis testing on the impact of asset size on innovation (H5) led to the rejection of the assumption. The hypothesis about the impact of membership size on innovativeness was accepted based on a t-statistic of 3.0934 (p-value=0.000).

Table 4. Path Coefficient

Relationship	Direct Effect	SD	T-Statistic	P-Values	Decision
Assets Size -> Innovativeness	-0.065	0.130	0.501	0.309	Rejected
Assets Size -> Risk Taking	-0.198	0.200	0.991	0.162	Rejected
Board Size -> Innovativeness	0.139	0.135	1.035	0.152	Rejected
Board Size -> Risk Taking	0.224	0.237	0.942	0.174	Rejected
Member Size -> Innovativeness	-0.359	0.091	3.934	0.000	Accepted
Member Size -> Risk Taking	-0.087	0.171	0.510	0.306	Rejected

Source: SmartPLS version 4.0.9.6 Output, 2023

5. Discussions

Figure 1 and Table 4 depict the results of a PLS-SEM analysis of the effect of board size, asset size, and membership size on cooperative risk-taking and innovativeness. According to the PLS-SEM analysis, board size (β=0.224, t= 0.942), asset size (β=-0.198, t= 0.991), membership size (β= -0.087, t=0.510) do not affect risk-taking activities of the cooperatives. As demonstrated by this result, the t-values are below the acceptable cut-off of 1.96 which indicates that board size, asset size, and membership have statistically insignificant effects on cooperative risk-taking. Moreover, the analysis in Figure 1 also shows that board size (β=0.139, t= 1.035) and asset size (β=-0.065, t= 0.501) do not affect the innovativeness of the cooperatives. This also falls below the acceptable threshold of 1.96 which means that board size and asset size have statistically insignificant effects on cooperative risk-taking.

The analysis also shows that board size (β=0.139, t= 1.035) and asset size (β=-0.065, t= 0.501) do not affect the innovativeness of the cooperatives. On the other hand, the analysis reveals that membership size (β=-0.359, t= 3.934) significantly and negatively affects the innovativeness of the cooperatives. This result exceeds the acceptable cut-off of 1.96, which indicates that membership size has a statistically significant effect on innovativeness. The results also explain that a decrease of 35.9% in membership will lead to an increase in cooperative innovativeness. This confirms that larger membership sizes might be associated with lower innovativeness (McGuirk et al., 2015).

While most of the studies on the effect of firm size on innovativeness focus on corporate organizations, it is worth noting that cooperatives serve a similar purpose to corporations. A

cooperative serves two primary purposes: generating financial outcomes and undertaking initiatives that prioritize the welfare of its members (Lauermann et al., 2020). Therefore, it may be inferred that huge enterprises, including cooperatives, exhibit lower levels of innovativeness. According to Acs & Audretsch (1987), "bigger businesses possess more inventive advantages in capital-intensive and concentrated sectors, while smaller companies have an edge in highly innovative and skilled labor industries". Similarly, the innovative performance of a cooperative was negatively impacted by the worldwide economic downturn, depending on the scale of the firm. According to Matras-Bolibok (2014), larger firms were more resilient to economic volatility.

Cooperatives may consider modifying their decision-making procedures to suit their industry. They might need to specifically modify the size of their boards to match the characteristics of their sets of opportunities for investment. The cooperatives would certainly benefit the most from operating with smaller boards when they had fewer opportunities for expansion (Nakano & Nguyen, 2012).

6. Conclusions

The cooperative contributions to the socio-economic development of rural provinces like Occidental Mindoro, Philippines have been long recognized by policymakers and academicians. The cooperatives have been instrumental in fostering economic growth, social progress, and improvement in the quality of life within the region. As such, governments provided them with tax incentives, financial aid, technical assistance, and capability training. That is why the number of cooperatives in the province has been increasing in recent years.

Based on the findings of the study, the researcher concluded that the size of the board, assets, and membership have an insignificant effect on the risk-taking activities of the cooperatives. The researcher also concluded that the size of the board and assets have an insignificant effect on the innovativeness of the cooperatives. However, the size of the membership has a significant negative effect on the innovativeness of the cooperatives.

7. Managerial Implications

The findings of this study can help individuals who aspire to establish cooperatives in structuring the organization. The study underscores the importance of having a balanced approach to risk-taking and a proactive attitude toward innovation. The cooperatives may also consider the size of their board of directors in the context of their opportunities and challenges. This may help them reduce any attributable costs of having a larger board.

Cooperatives may also take into consideration that having a larger membership may present challenges in terms of maintaining a high level of innovativeness. Maintaining a high level of innovativeness becomes more complex as the membership grows. The researcher recommends that the cooperatives should carefully deliberate on the number of members who can participate in the decision-making body by classifying the members into regular- those who have the right to vote- and associate -those who do not have the right to vote. This can be done by determining the optimal number of ordinary shares and preference shares for general membership.

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