



Exploring the linkages between formal ownership and psychological ownership for the organization: The mediating role of organizational justice

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Extending previous research on formal ownership and psychological ownership in organizations, this study simultaneously examines the relationships between employee participation in three formal ownership programmes (i.e. profit sharing, participation in decision making, access to business information) and psychological ownership for the organization, while also exploring the mediating roles of distributive and procedural justice. Data were collected from 387 R&D engineers based at 20 high-technology firms in Taiwan. A structural equation modelling analysis was conducted to test our hypotheses, and the results show that employee participation in profit sharing, decision making, and access to business information were all positively related to psychological ownership. Moreover, distributive justice fully mediated the relationship between participation in profit sharing and psychological ownership, while procedural justice mediated the relationship between participation in decision making, access to business information, and psychological ownership.

In today's knowledge-based economy, highly skilled workers are recognized as critical resources that can enhance a firm's competitive advantage, and this is particularly true for high-technology firms (Rousseau & Shperling, 2003). Therefore, high-technology firms have become increasingly dependent on their highly skilled knowledge workers, and employers often make significant efforts to attract and retain these employees by offering various incentives (Lee & Maurer, 1997). Typically, such incentives are *formal ownership*¹ oriented (e.g. employee stock ownership programmes (ESOP), or participation in decision making) and designed to align employees' shared goals and financial interests with those of the organization, and to strengthen employees' *psychological ownership for the organization* (Wagner, Parker, & Christiansen, 2003).

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¹According to Pierce, Rubenfeld, and Morgan (1991) and Pierce and Rodgers (2004), employee ownership can be operationalized both as a type of formal (objective) ownership or as psychological experience of ownership. Formal ownership emphasizes the provision of legal rights (i.e. equity, influence, information) to employees, while psychological ownership pertains to employees' feeling as they are the owners of the organization.

Thus, the question of whether employees actually do experience a sense of psychological ownership for the organization through formal ownership is a critical issue for both academics and practitioners (Pierce & Rodgers, 2004; Pierce, Rubenfeld, & Morgan, 1991; Wagner *et al.*, 2003). Concerning high-technology firms in Taiwan, the area of the present study, large-scale adoptions of formal ownership programmes have also been used to attract talented employees (see Chiu & Tsai, 2007; Cin, Han, & Smith, 2003; Han & Shen, 2007). As a result, high-technology firms in Taiwan serve as an excellent research ground to examine the links between formal ownership and psychological ownership within organizations.

Psychological ownership is defined as a state in which individuals feel as though the target of ownership (e.g. the organization) or a piece of that target is 'theirs' (Pierce, Kostova, & Dirks, 2001, p. 299). The feeling of ownership can be directed at an organization, a group, or a job. In this study, we focus on *the organization* as the target of psychological ownership. Recent studies have demonstrated that psychological ownership for the organization is positively related to job satisfaction, organizational commitment, organizational citizenship behaviour (O'Driscoll, Pierce, & Coghlan, 2006; Van Dyne & Pierce, 2004; VandeWalle, Van Dyne, & Kostova, 1995), and financial performance (Wagner *et al.*, 2003). However, the antecedents of psychological ownership have not been extensively addressed in the empirical literature. From a theoretical perspective, Pierce *et al.* (1991) theorized that formal ownership constructed around three rights (i.e. *equity, influence, information*) could create feelings of employees' psychological ownership relating to the organization. Pierce *et al.* also proposed three routes² leading to the emergence of psychological ownership: *investing the self into the target, controlling the target, and coming to intimately know the target*. Still, past studies have not simultaneously examined the relationships between all three rights of formal ownership and psychological ownership for the organization. For example, Wagener *et al.* (2003) examined the equity right, while O'Driscoll *et al.* (2006) and Pierce, O'Driscoll, and Coghlan (2004) examined the influence right. In order to understand the formal-psychological ownership linkages in a complete view, Pierce and Rodger (2004) have called for studies to simultaneously test the theoretical model linking all three rights of formal ownership and psychological ownership for the organization.

Therefore, the present study is designed to address several gaps in the ownership literature. First, while the studies performed by Pierce *et al.* (2004), O'Driscoll *et al.* (2006), and Wagner *et al.* (2003) have provided empirical evidence supporting links between formal ownership and psychological ownership, these studies did not include the information right (e.g. the access to business information) as a predictor of psychological ownership. In response to Pierce and Rodger's (2004) call, we simultaneously tested the relationships between formal ownership with three rights (i.e. profit-sharing plans, participative decision making, access to business information) and psychological ownership for the organization. The advantages of this approach include: a full capture of the effects of formal ownership on psychological ownership and an account of all other effects of the study variables.

² According to Pierce and Rodgers (2004), formal ownership constructed with three rights is more or less parallel to the three routes to psychological ownership (p. 598). We follow their viewpoint and argue that the three rights are the identical to the three routes (i.e. equity rights are similar to the route of investing one's self to the target, influence rights are similar to the route of controlling the target, while information rights are similar to the route of intimately knowing the target).

Second, we identify the mediating mechanisms of justice perceptions (i.e. distributive and procedural justice) that link formal ownership and psychological ownership for the organization. Clarifying the mediating mechanisms is important because it contributes to the theoretical domains of psychological ownership by answering questions pertaining to *why* formal ownership leads to psychological ownership for the organization (Whetten, 1989). In our view, both theoretical and practical perspectives suggest that distributive and procedural justice could play such mediating roles. Many organizational arrangements (e.g. profit sharing, participation in decision making, information sharing) can be directly linked to employee perceptions regarding distributive and procedural justice, which in-turn influence their attitudes towards the organization (Aryee, Chen, & Budhwar, 2004; Folger & Cropanzano, 1998; Pare & Tremblay, 2007; Welbourne, Balkin, & Gomez-Mejia, 1995). As formal ownership provides employees the rights to share the financial returns of the organization (e.g. profit-sharing plans), retain a degree of influence on decisions (e.g. participation in decision making), and gain access to business information, employee participation in formal ownership programmes should also lead to higher levels of organizational justice perceptions (Cox, 2000). As a result, employees' justice perceptions would strengthen identification with the organization (Olkkonen & Lipponen, 2006) and the feeling that the organization is their 'home'.

Taken together, the present study narrows the aforementioned research gaps by simultaneously examining whether formal ownership leads to psychological ownership for the organization through distributive and procedural justice perceptions. Figure 1 outlines the conceptual model of this study, in which the level of analysis focused on the individual.

Theory and hypotheses

Antecedents of psychological ownership for the organization

According to Dittmar (1992), it is common for people to psychologically experience a connection between the self and the various targets of possession. Possessions (i.e. feeling as though an object, entity, or idea is 'MINE' or 'OURS') play a dominant role in the owner's sense of identity that can turn the possessions into a part of the extended self. Furby (1978) and Rudmin and Berry (1987) also argued that the core of

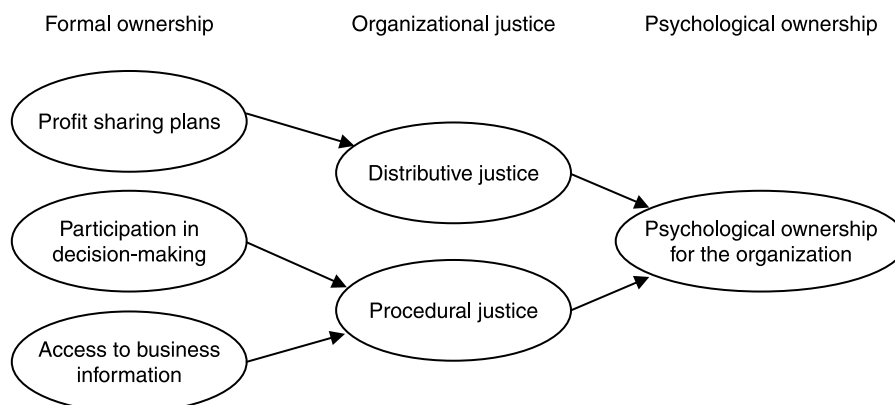


Figure 1. Conceptual model linking formal ownership and psychological ownership for the organization.

psychological ownership is a sense of possession. Drawing from the above arguments and Pierce *et al.*'s (2001) definition, psychological ownership for the organization can be defined as *a state in which employees feel that the organization is experienced possessively* (i.e. the organization is 'THEIRS').

Pierce *et al.* (1991) proposed that psychological ownership is created when formal ownership is designed and constructed according to three fundamental rights: the right to possess of some share of the organization's financial values (*equality*), the right to exercise influence over the organization (*influence*), and the right to be given information about the current status of the organization (*information*). Following in this vein, three formal ownership programmes are particularly relevant to three rights mentioned above (Kaarsemaker & Poutsma, 2006; Rousseau & Shperling, 2003): *profit-sharing plans* provide employees with the rights to financial returns from the organization (i.e. the equality right; Ben-Ner, Han, & Jones, 1996); *participation in decision making* allows employees to influence organizational decisions (i.e. the influence right; Ben-Ner *et al.*, 1996); and *access to business information* (i.e. strategic plans, or information about a merger or acquisition) helps employees to know more about the organizational status (i.e. the information right; Kaarsemaker & Poutsma, 2006; Lawler, Mohrman, & Ledford, 1992). On this basis, employees who have extensively participated in these three formal ownership programmes are likely to develop a sense of psychological ownership. Therefore, we may consider employees' *participation in profit-sharing plans* (e.g. ESOP), *participation in decision making*, and *access to business information* as three potential antecedents of psychological ownership for the organization.

Although Pierce *et al.*'s (1991) propositions provide us with an important lens to understand the effects of formal ownership, one important question remains: why do employees come to experience psychological ownership through participation in these formal ownership programmes? In an attempt to answer this question, Pierce *et al.* (2001) theorized three major routes through which employees' psychological ownership emerges: *the extent to which employees invest themselves into the target*, *the degree and the ability to control over the target*, and *the extent to which an individual intimately knows the target*. As Pierce and Rodgers (2004) indicated, formal ownership constructed with the three rights is more or less parallel to the three 'routes' (p. 598), providing connections between formal ownership and psychological ownership. In this study, we adhere to this viewpoint and provide both theoretical and empirical arguments as to why participation in these three formal ownership programmes leads to psychological ownership for the organization in the following section.

Participation in profit-sharing plans

According to Pierce *et al.* (2001), the first route to psychological ownership³ is the degree to which employees invest themselves into the target. Employees' self-investment comes in many forms, including investments of one's time, physical energy, or opportunity costs. When employees invest themselves into the target, the target becomes a representation of the employees, which in-turn nurtures employees' feelings of ownership of the object (Csikszentmihalyi & Rochberg-Halton, 1981). As such, the

³ We adjusted the order of three 'routes' to psychological ownership proposed by Pierce *et al.* (2001) in order to match the aforementioned three formal ownership systems.

greater the degree to which employees invest themselves into an organization, the greater is the level of psychological ownership they experience (Pierce, Kostova, & Dirks, 2003).

Profit-sharing plans are devised based on the belief that employees will be more efficient if they have an invested interest in the success of the organization (Wagner *et al.*, 2003). Since employee participation in profit-sharing plans is derived from their investment into the organization (e.g. tenure, hours worked, performance; Pierce & Rodgers, 2004, p.598), and provides them with equality rights pertaining to organizational financial returns (Ben-Ner *et al.*, 1996; Pierce *et al.*, 1991), then, we expect that employee participation in profit-sharing plans would lead to a higher level of psychological ownership. Empirical evidence such as that reported by Pendleton, Wilson, and Wright (1998) pointed out that shareholding is positively related to perceptions of ownership. Wagner *et al.* also found that the level of participation in profit-sharing plans is positively related to psychological ownership beliefs. Taken together, the following is proposed:

Hypothesis 1: Employees' participation in profit sharing plans (e.g. ESOP) is positively related to their psychological ownership for the organization.

Participation in decision making

The second route to psychological ownership concerns the degree to which an individual is able to control the target. As employees perceive that they have increasing amounts of control over the organization, the organization increasingly is experienced as a part of the 'self' (Pierce *et al.*, 2001). Managers can provide employees with many opportunities to gain a sense of control of the organization. For example, formal ownership typically entails a right to participate in decision making (Locke & Schweiger, 1979; Rhodes & Steers, 1981; Rousseau & Shperling, 2003). When organizations allow employees to participate in and have influence over organizational decisions or procedures, employees will be more likely to perceive that 'This is MY organization' (Pierce *et al.*, 2003). As such, a sense of psychological ownership for the organization is also likely to emerge (Pierce *et al.*, 2004).

Given that participation in decision making allows employees to directly influence (control) organizational decisions, we further expect that an increase in employee participation in decision making will be positively related to their sense of psychological ownership for the organization. We build on the same argument as O'Driscoll *et al.* (2006) and Pierce *et al.* (2004), who provided empirical evidence that supports the positive relationship between participation in decision making and psychological ownership. To sum up, the following is proposed:

Hypothesis 2: Employees' participation in decision-making is positively related to their psychological ownership for the organization.

The access to business information

The third route to psychological ownership is the extent to which an individual intimately knows the target (Pierce *et al.*, 2003). That is, as the information an employee possesses about an organization becomes greater and more complete, the deeper is the relationship between the self and the organization. By virtue of acquiring information and being familiar with the organization, employees can gain a feeling of ownership (Pierce *et al.*, 2001). Thus, organizations can enhance employees' psychological

ownership by providing them with the rights to information about the status of the organization (Pierce *et al.*, 1991).

Specifically, Rousseau and Shperling (2003) proposed that the extent to which employees can access business information (e.g. business, strategic plans) influences their perceptions of being an 'owner' of the organization. Sharing business information with employees not only permits them to intimately know the status of the organization, but also signals that employers are deemed to be trustworthy (Ferrante & Rousseau, 2001; Lawler *et al.*, 1992). Pierce and Rodgers (2004) also argued that employees' experiences of psychological ownership are positively influenced by the granting of access to important organizational information. As a result, we expect that employee's access to business information will lead to greater levels of psychological ownership for the organization. Thus, the following is proposed:

Hypothesis 3: Employees' access to business information is positively related to their psychological ownership for the organization.

The mediating roles of distributive and procedural justice

Although past studies provided preliminary evidence that employees who participate in the aforementioned three formal ownership programmes tended to exhibit greater levels of psychological ownership for the organization (O'Driscoll *et al.*, 2006; Pierce & Rodgers, 2004; Wagner *et al.*, 2003), it remains plausible that these three formal ownership programmes all lead to a sense of psychological ownership, but through different processes. For example, Wagner *et al.* proposed two models that link formal ownership programmes and psychological ownership for the organization: an *extrinsic model* and an *instrumental model*. The former posits that formal ownership results in psychological ownership because participation in formal ownership may be financially rewarded (e.g. profit-sharing plans), while the latter suggests that psychological ownership emerges because formal ownership increases their influence on the organization (e.g. participation in decision making) and the information available to employees (e.g. information sharing). It is plausible that these models may be differentially linked to two important types of justice perceptions: distributive justice and procedural justice⁴ (e.g. Cropanzano & Ambrose, 2001; Loi, Ngo, & Foley, 2006; Viswesvaran & Ones, 2002).

Distributive justice refers to the perceived fairness of the organizational allocation of resources (Folger & Cropanzano, 1998; Witt, Kacmar, & Andrews, 2001). Employees make distributive justice judgments when receiving financial rewards (e.g. salary or bonuses from profit-sharing plans) in exchange for the work they have done, which in-turn influence their attitudes towards the organization (Ambrose & Arnaud, 2005; Feather, 1999). In the case of the extrinsic model, when employees feel fairly treated after participation in profit-sharing plans, they experience a sense of distributive justice.

⁴Recent studies suggest that organizational justice can be categorized into four dimensions: distributive, procedural, interpersonal, and informational (Colquitt, 2001). The present study focuses on distributive and procedural justice for several reasons. First, studies on distributive and procedural justice have determined that they are clearly linked to organizational practices and employees' attitudes (Cropanzano & Ambrose, 2001; Lam, Schaubroeck, & Aryee, 2002), which fits our theoretical model. Second, Folger and Cropanzano (1998) and Viswesvaran and Ones (2002) argued that interpersonal and informational justice may actually be seen as aspects of procedural justice. Third, although the meta-analysis showed that interpersonal and informational justice explained significant incremental variance in fairness perceptions, distributive and procedural justice were still the strongest predictors of organizational attitudes (Colquitt, Conlon, Wesson, Porter, & Ng, 2001). Considering the above, we choose to focus on distributive and procedural justice in this study.

In turn, their positive attitudes (e.g. psychological ownership) towards the organization may emerge. Thus, the extrinsic model of formal ownership could work through the mechanism of perceived distributive justice.

Procedural justice refers to the perceived fairness of the procedure used to make decisions (Folger & Cropanzano, 1998; Korsgaard, Schweiger, & Sapienza, 1995). Employees perceive aspects related to procedural justice when they experience opportunities to influence decisions, to express their voices, or to possess accurate information used for making decisions (Price, Lavelle, Henley, Cocchiara, & Buchanan, 2006; Thibaut & Walker, 1975). As a result, when formal ownership increases employee influence on and information about the organization, their procedural justice perceptions are enhanced, leading to a greater sense of psychological ownership for the organization. Therefore, we posit that the instrumental model of formal ownership may work through the mechanism of perceived procedural justice.

Taken together, we propose that the three formal ownership programmes enhance psychological ownership through the experience of distributive or procedural justice. We introduce the proposed mechanisms in the following section.

Profit-sharing plans → Distributive justice → Psychological ownership

Taking the above into consideration, it is clear that employee participation in profit-sharing plans may enhance their perceptions of distributive justice, which in-turn may lead to the experience of psychological ownership. This mechanism may be explained by two possible perspectives: equity theory and economic exchanges.

According to equity theory (Adams, 1965), individuals compare their ratio of inputs-outputs with the ratio of a referent when receiving financial rewards. The referent can be the self, others, or even the organization. If the resultant ratios are equal, individuals perceive a high level of distributive justice (Viswesvaran & Ones, 2002). Profit-sharing plans (e.g. ESOP) are particularly apt at giving employees the opportunity to compare their inputs-outputs ratios with the organization (Coyle-Shapiro, Morrow, Richardson, & Dunn, 2002). For example, profit-sharing plans align the financial goals of the employee and the organization (i.e. when the organization gains, then so do the employees in a calculable form), and promote the belief that employees have a vested interest in the success of the organization (Rousseau & Shperling, 2003). Most importantly, profit-sharing plans provide employees with the right to share organizational economic returns and enable them to own company stock (Ben-Ner *et al.*, 1996). When employees are highly involved in profit-sharing plans, their financial rewards become closely aligned with organizational gains (Welbourne *et al.*, 1995). These help to equalize the compared inputs-outputs ratios between the organization and the individual, and lead to the higher levels of distributive justice perceptions. Thus, employee participation in profit-sharing plans should be positively related to their sense of perceived distributive justice. Empirically, Ledford and Lucy (2003) found that employees whose stock option compensation exceeded that of their salary were more likely to see the distribution of stock within the company as fair, supporting this argument.

According to social exchange theory (Blau, 1964), employee-organization exchange relationships can be either economic or social. As stated above, distributive justice is concerned about the fairness of economic exchange relationships between employees and organizations (Cropanzano & Ambrose, 2001; Folger & Cropanzano, 1998). Employees with high perceptions of distributive justice represent those satisfied by their

economic exchanges with the organization, which may result in more positive attitudes towards the organization (Cropanzano & Ambrose, 2001; Roch & Shanock, 2006). On the basis of the economic exchanges perspective, when employees perceive they are in a favourable economic exchange relationship (i.e. possessing high distributive justice), they are motivated to repay and increase their self-investment in the organization (Loi *et al.*, 2006). As such, their psychological ownership for the organization would be strengthened. Additionally, Olkkonen and Lipponen (2006) showed that employees with higher distributive justice perceptions are more likely to identify themselves as a member of the organization. In this manner, employees become more embedded in the organization and their psychological ownership would also increase (Pierce & Rodgers, 2004). Following in this vein, we expect employees' distributive justice perceptions to be positively related to their psychological ownership for the organization.

Amalgamating the above, we argue that employees' perceived distributive justice mediates the relationship between employee participation in profit-sharing plans and psychological ownership for the organization. Thus, the following is proposed:

Hypothesis 4: Employees' perceived distributive justice mediates the relationship between their participation in profit sharing plans and psychological ownership for the organization.

Participation in decision making → Procedural justice → Psychological ownership

One of the most important ways to shape perceptions of procedural justice is through participation in decision making (Lind, Kanfer, & Earley, 1990; Roberson, Moye, & Locke, 1999). According to control-mediated theories of procedural justice (Brett & Goldberg, 1983; Thibaut & Walker, 1975), participation in decision making leads to higher perceived procedural justice for two reasons. First, participation in decision making gives employees the right to participate in and to express their voices during the process of decision making (process control). Second, participation in decision making also gives employees the right to directly influence decisions and outcomes (decision control). As a result, a high level of participation in decision making allows employees a greater control in terms of procedures, which in-turn increases the perceptions of procedural justice (Folger & Cropanzano, 1998; Korsgaard *et al.*, 1995; Price *et al.*, 2006). Several studies have found empirical evidence that support the positive relationship between participation in decision making and procedural justice perceptions. For example, Aryee *et al.* (2004) and Roberson *et al.* (1999) found that participation in decision making is positively related to employees' perceived procedural justice ($r = .27$ and $.41$; $p < .01$).

Past studies suggested that perceptions of procedural justice may encourage positive attitudes towards the organization (Aryee, Budhwar, & Chen, 2002; Lind & Tyler, 1988). Fair procedures allow employees to have a sense of control over the organizational decision making (Korsgaard *et al.*, 1995; Viswesvaran & Ones, 2002), thereby increasing the emergence of ownership feelings (Pierce *et al.*, 2001, p. 300). Furthermore, the group-value model suggests that procedural justice is an important element in shaping employees' organizational identifications because procedural justice communicates to employees that they are valued by the organization (Aryee *et al.*, 2004; Robbins, Summers, Miller, & Hendrix, 2000; Tyler & Blader, 2003). As such, individuals exhibiting high levels of procedural justice perceptions are liable to be proud of being members of their organizations (Olkkonen & Lipponen, 2006), develop confidence in the safety of their investment of time and effort (Aryee *et al.*, 2004), and feel that it is their 'home'. As a result, we expect that employees' procedural justice perceptions will mediate the

relationship between employee participation in decision making and psychological ownership. Thus, we propose:

Hypothesis 5: Employees' perceived procedural justice mediates the relationship between their participation in decision-making and psychological ownership for the organization.

Access to business information → Procedural justice → Psychological ownership

Past research suggests that various aspects of sharing business information are important to employees' perceived procedural justice, including providing employees with accurate information regarding the business status, and giving timely feedback about organizational decisions (Korsgaard *et al.*, 1995; Sapienza & Korsgaard, 1996). Employee access to business information (e.g. financial performance, strategies) is one of the most effective ways to foster employee involvement with the organization, because it conveys to employees a sense of being trusted, and a sense that they in-turn can trust the organization (Lawler *et al.*, 1992; Sapienza & Korsgaard, 1996). The broad distribution of business information often reflects the desire for a common frame of reference among managers and employees in making business decisions (Cole & Flint, 2004; Rousseau & Shperling, 2003). Thus, when the organization provides more information about organizational procedures to employees, they are more likely to regard these procedures as fair (VanYperen, 1998). An empirical study by Pare and Tremblay (2007) showed that employees who were granted access to more business information perceived a higher level of procedural justice ($r = .49$), supporting for the positive relationship between employees access to business information and their perceptions of procedural justice.

Following Hypothesis 5, based on the perspective of control and the group-value model, we expect that employees' perceived procedural justice would lead to the emergence of psychological ownership. Taken together, we propose:

Hypothesis 6: Employees' perceived procedural justice mediates the relationship between the degree of their access to business information and psychological ownership for the organization.

Method

Sample and procedure

The participants were R&D engineers selected from 20 firms defined as high-technology firms by the Industrial Development Bureau Ministry of Economic Affairs in Taiwan. To ensure that the sample firms had similar environmental characteristics, we also ensured that these firms emphasized innovation in their business strategies, deployed a significant percentage of their financial resources to R&D, and employed a relatively high percentage of scientists and engineers in their workforce⁵ (Milkovich, 1987). Moreover, to maximize the external validity of the results to high-technology firms, we chose firms with large variations in terms of capital employed (mean = 304.38, $SD = 467.69$ (in million NT)) and subindustry (i.e. computer systems ($N = 6$),

⁵ We checked the 20 firms' business strategies and the percentage of scientists and engineers in their workforce (mean = 18, $SD = 9$ (in %)) from annual reports downloaded from their websites. In addition, we collected R&D-to-sales ratio data (mean = 5.5, $SD = 8$ (in %)) from the Taiwan Economic Journal database (a database that annually reports Taiwanese firms' financial data).

electronic communications ($N = 2$), optoelectronics ($N = 4$), semiconductors ($N = 4$), Internet ($N = 2$), and software ($N = 2$)).

The procedure for distributing questionnaires involved five steps. First, we contacted the HR personnel from each firm by telephone, invited them to participate in the survey, and obtained their mailing address. Second, to reduce the potential of respondent social desirability problems (i.e. R&D engineers speculating about the research purpose and responding with what they considered to be social desirable answers), the HR personnel were simply told that the purpose of this study was to investigate the working conditions of the R&D engineers. Third, to avoid sample bias, we asked the HR personnel to assist us by selecting respondents (i.e. R&D engineers) with the greater range of age and tenure to avoid the problem of biased sample. Fourth, given the considerations of cost and willingness to cooperate, we sent 35 questionnaires to each firm. The questionnaires were then distributed to R&D engineers by the HR personnel. Finally, after the R&D engineers completed the questionnaires, the HR personnel gathered the questionnaires and mailed them back to us.

Out of the 700 questionnaires distributed, 387 were returned, giving a response rate of 55%. Participants were predominantly male (62%) and 63% were aged between 20 and 30 years (mean = 30.22, $SD = 5.8$). Most participants (63%) had a Bachelor's degree. Among the participants, 85% had an organizational tenure of less than 5 years (mean = 3.38, $SD = 4.25$).

Measures

In order to ensure the content validity of measurements (Schwab, 2005), all measurements were translated into Chinese by the authors, and then reviewed by five bilingual experts who majored in organizational behaviour to assess the appropriateness and adequacy of the translations.⁶

Psychological ownership for the organization

Psychological ownership for the organization was measured using Van Dyne and Pierce's (2004) four-item scale (e.g. This is MY organization; I sense that this organization is OUR company). Responses were made on a 6-point scale (1 = *strongly disagree* to 6 = *strongly agree*). The Cronbach's alpha for this scale was .83.

Participation in profit sharing

To measure the level of participation in profit-sharing plans, we collected three objective indicators from each respondent. Respondents were asked to report: (1) the percentage of their total annual compensation paid in the form of a cash bonus (mean = 4.28, $SD = 9.6$); (2) the percentage of their total annual compensation paid as a stock bonus (mean = 4.98, $SD = 11.7$); and (3) the percentage of stock issuances in terms of their total annual compensation (mean = 2.08, $SD = 7.9$). We averaged three

⁶ Although the present study did not apply a back-translation approach, we asked these bilingual experts to evaluate the content validity and semantic equivalence of the measurements (Shaffer & Riordan, 2003). We provided definitions for all constructs measured in this study, and attached the English version to the Chinese translation of the questionnaire given to all five experts. Each expert reviewed all items, and gave feedback on those items they thought were translated inappropriately. This review process was repeated until a consensus on appropriateness was achieved.

indicators to create a single score that represents the degree of participation in profit sharing. The Cronbach's alpha for this scale was .47.

The relatively low alpha associated with the profit-sharing measure may be due to a low homogeneity between the items (Cortina, 1993). According to Law, Wong, and Mobley (1998, p. 745), the measure of job characteristics (e.g. profit-sharing plans) belongs to the additive form of the aggregate model. That is, the construct is formed as a mathematical function of its items (i.e. a composite score). As each item may represent a different facet of job characteristics, the correlations between these items are independent or uncorrelated (p. 751). The results indicated that inter-item correlations between profit-sharing items are only .26–.33, which is consistent with our arguments.

As Nunnally and Bernstein suggested, the 'heterogeneity would be a legitimate part of the test if it were part of the domain of content implied by the construct' (Nunnally & Bernstein, 1994, p. 312). Therefore, we believe that these items were still meaningful because each of these items reflected a unique portion of the profit-sharing plans in question.

Participation in decision making

The six items used to measure participation in decision making were adapted from questionnaires developed by the Industrial Democracy in Europe (IDE, 1976, 1993). We also referred to Locke and Schweiger's (1979, p. 276) categorization and definitions to ensure that the content of the items was appropriate.⁷ The respondents were asked to evaluate the extent to which they could influence on decisions (e.g. changes in work flow, the altering of work procedures, the design of job content, managing job rotation, setting working hours, establishing work rules). Responses were made on a 5-point scale (0 = *None: not at all*; 1 = *To some extent: my supervisor provides me with related information but I did not have the right to express my opinions*; 2 = *To a Moderate Extent: I had the right to express my opinions*; 3 = *To a Great Extent: my supervisor discussed the decision with me*; 4 = *Full participation: my supervisor and I made the decision together*). The Cronbach's alpha for this scale was .87.

Access to business information

To measure the degree to which employees had access to business information, six items were adapted from the IDE (1976, 1993) questionnaires. The respondents were asked to evaluate the extent to which they could access the following business information: sales volumes and market share; the cost of labour; financial performance; investment strategies; mergers and acquisitions; and plant closures or relocations. The responses were made on a 5-point scale (0 = *None: not at all*; 1 = *To Some Extent: my supervisor provides me with related information, but I cannot access this information directly*; 2 = *To a Moderate Extent: my supervisor provides me with related information, and I can access to this information directly*; 3 = *To a Great Extent: I can access to the related information directly, and my supervisor will consult with me regarding the information*; 4 = *Full sharing: this decision was made by my supervisor and I together*). The Cronbach's alpha for this scale was .91.

⁷ According to Locke and Schweiger's (1979) categorization, work-related participation in decision making includes work methods, job design, resting pauses, speed of work, work hours, and task assignments, which is similar to the content of IDE items.

Distributive and procedural justice

Distributive justice and procedural justice were measured using 15 items derived from scales composed by Alexander and Ruderman (1987) and Moorman (1991). These included eight items pertaining to distributive justice (e.g. in my organization I am fairly rewarded for the amount of effort I have put in) and seven items pertaining to procedural justice (e.g. I am able to express my views and feelings during procedures used to make decisions in my organization). The responses were made on a 6-point scale (1 = *strongly disagree* to 6 = *strongly agree*). The Cronbach's alpha values for distributive justice and procedural justice were .81 and .87, respectively.

Data analysis

In order to test our hypotheses, we conducted structural equation modelling (SEM) analyses using LISREL 8.54 with maximum-likelihood estimation. Following the suggestions of Anderson and Gerbing (1988), we adopted a two-stage approach to test the structural equation model. First, we examined the discriminant and convergent validity of the measurement model with a series of confirmatory factor analyses (CFA). Second, we examined the hypothesized model by assessing the conditions for mediation (Baron & Kenny, 1986). For providing a stringent test of the hypotheses, we also examine the alternative nested model. Since we made no prediction as to whether the relationships in the hypothesized model represented full or partial mediation, we tested both the models: a fully mediated model and a partially mediated model. We used the overall model Chi-squared index, the goodness-of-fit index (GFI), the comparative fit index (CFI), the normed fit index (NFI), and the root mean square error of approximation (RMSEA) to assess the model fit (Bollen, 1989; Jöreskog & Sörbom, 1999). All analyses were based on the covariance matrix.

Results

Table 1 presents the means, standard deviations, reliabilities, and correlations of the study variables. Because of the wide range of scale reliabilities ($\alpha = .47 - .91$), the correlation matrix was corrected for attenuation due to measurement error (see Kristof-Brown, Barrick, & Franke, 2002, p. 36). The results show that participation in decision making, profit sharing, access to business information, procedural justice, and distributive justice are all positively and significantly related to psychological ownership ($r = .23 - .48$, all p values $< .05$).

Confirmatory factor analyses

To evaluate the discriminant and convergent validity of measures, we conducted a series of CFA using LISREL 8.54. Using the maximum-likelihood estimation, we compared the fit indices of seven competing models (see Table 2).

As can be seen in Table 2, the results showed that the 5-factor model 1, the 5-factor model 2, and the 6-factor model provided a more adequate fit than the 1-factor model. However, the Chi-squared difference tests showed that the χ^2 decrement between the 5-factor model 1, the 5-factor model 2, and the 6-factor model was significant ($\Delta\chi^2 = 66$ and 37 ; $\Delta df = 5$). Thus, we concluded that the 6-factor model (the proposed model) was the better model of the three. CFA results supported this conclusion, indicating the distinctiveness of the six constructs measured in this study. Moreover, the factor loadings of all items in the 6-factor model were statistically significant ($p < .01$), suggesting that the convergent validity of all measures was acceptable.

Table 1. Means, standard deviations, reliabilities, and correlations^a among variables

Variable	M	SD	1	2	3	4	5	6
1. Psychological ownership	3.72	0.99	.83	.26**	.23**	.30**	.46**	.48**
2. Decision making	1.36	0.96	.15**	.87	.31**	.51**	.28**	.29**
3. Profit sharing	4.16	7.29	.13**	.15**	.47	.49**	.28*	.16
4. Access to business information	0.24	0.50	.16**	.34**	.31**	.91	.28**	.29**
5. Distributive justice	3.36	0.67	.37**	.21**	.16**	.15**	.81	.62**
6. Procedural justice	3.50	0.78	.38**	.22**	.10	.19**	.50**	.87

^a Correlations below the diagonal are zero-order correlations and correlations above the diagonal have been corrected for attenuation based on SEM results.

(1) Cronbach's alpha coefficients are presented in boldface on the diagonal.

(2) * $p < .05$; ** $p < .01$ (two-tailed); $N = 387$.

Table 2. Results of confirmatory factor analyses

Models	χ^2	df	$\Delta\chi^2$	Δdf	GFI	CFI	NFI	RMSEA
1. 1-Factor model	1,742.1	527	–	–	.73	.82	.72	0.11
2. 4-Factor model 1 ^a	1,154.2	521	587.9	6	.84	.91	.80	0.06
3. 4-Factor model 2 ^b	874.2	521	867.9	6	.87	.95	.86	0.05
4. 5-Factor model 1 ^c	563.8	517	1,178.3	10	.91	.96	.88	0.02
5. 5-Factor model 2 ^d	534.8	517	1,207.3	10	.91	.97	.89	0.01
6. 5-Factor model 3 ^e	866.3	517	875.8	10	.87	.96	.85	0.05
7. 6-Factor model (proposed model)	497.8	512	1,244.4	15	.93	.99	.91	0.01

Note. The values of $\Delta\chi^2$ and Δdf were differences between the 1-factor model and other models.

^a Combines participation in decision making, access to business information and procedural justice into one factor.

^b Combines three forms of formal ownership into one factor.

^c Combines two justice perceptions into one factor.

^d Combines profit sharing and procedural justice into one factor.

^e Combines participation in decision making and access to business information into one factor.

Testing alternative models

As no prediction was made about whether the hypothesized model represented full or partial mediation, we tested both the models with SEM. The results of the fully mediated model are presented in Figure 2. The partially mediated model differed from the fully mediated model in that it had three direct paths from profit sharing, participation in decision making, and access to business information to psychological ownership for the organization.

Results showed that both the fully mediated model ($\chi^2[519] = 561.8$; $\chi^2/df = 1.08$, GFI = .92, CFI = .98, NFI = .91, RMSEA = 0.01) and the partially mediated model ($\chi^2[516] = 557.4$; $\chi^2/df = 1.08$; GFI = .91, CFI = .97, NFI = .89; RMSEA = 0.01) provided an adequate fit to the data. However, the Chi-squared difference test showed that the χ^2 decrement between the fully and the partially mediated models was not statistically significant ($\Delta\chi^2 = 4.4$, $\Delta df = 3$). Furthermore, the coefficients of three direct paths were non-significant ($\beta = 0.03$, 0.08, and 0.03, all p values $> .05$), and the results of the hypothesized structural relationships were identical in two models. Based on model

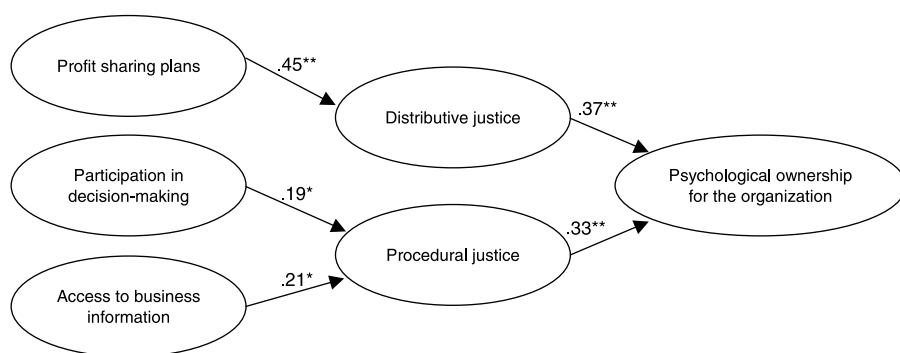


Figure 2. Structural equation model with maximum-likelihood estimates (standardized). $\chi^2[519] = 561.8$; $\chi^2/df = 1.08$, GFI = .92, CFI = .98, NFI = .91, RMSEA = 0.01. All indicators and correlations among the exogenous variables are not included. * $p < .05$; ** $p < .01$ (two-tailed). $N = 387$.

parsimony and the results of fit indices and Chi-squared difference test, we concluded that the fully mediated model was the better model and used it to examine hypotheses.

Hypotheses testing

In order to test Hypotheses 1–3, we followed Baron and Kenny's (1986) suggestion to assess the first condition of mediation. As can be seen in Table 1, the corrected correlation coefficients indicate that participation in profit-sharing plans, decision making, and access to business information are all positively correlated to psychological ownership of the organization ($r = .23, .26, \text{ and } .30$, all p values $< .01$). Moreover, the results of the fully mediated model show that the total effects of participation in profit-sharing plans, decision making, and access to business information on psychological ownership of the organization were statistically significant (standardized total effects = .17, .07, and .07, all p values $< .05$). Therefore, Hypotheses 1–3 were all supported.

For Hypotheses 4–6, we assessed the second and third conditions of mediation. As the results shown in Figure 2, the path coefficient of profit-sharing plans to distributive justice ($\beta = 0.45$, $p < .01$), and the path coefficients of participation in decision making ($\beta = 0.19$, $p < .05$) and access to business information ($\beta = 0.21$, $p < .05$) to procedural justice were all positive and significant. Moreover, both distributive and procedural justice were positively related to psychological ownership of the organization ($\beta = 0.37$ and 0.33 , all p values $< .01$).

In order to test whether indirect effects of the three predictors on the dependent variable via the mediators exist, we performed Sobel tests to examine the statistical significance of the three mediated relationships (see O'Driscoll *et al.*, 2006; Sobel, 1982). We followed the suggestions of Preacher and Hayes (2004) and coded the standard error of path coefficients (from the fully mediated model), and calculated the critical ratio as a test of whether the indirect effects were significantly different from zero. The results of the Sobel test confirmed the existence of significant mediating effects of participation in profit sharing ($Z = 3.43$, $p < .01$), decision making ($Z = 2.16$, $p < .05$), and access to business information ($Z = 2.25$, $p < .05$) on psychological ownership via distributive and procedural justice. Therefore, Hypotheses 4–6 were also supported.

Discussion

The present study responded to Pierce and Rodgers' (2004, p.607) call by simultaneously testing the linkages between formal ownership with three rights and psychological ownership for the organization, and examining the mediating roles of distributive and procedural justice. In comparison with past studies (e.g. O'Driscoll *et al.*, 2006; Pierce *et al.*, 2004; Wagner *et al.*, 2003), our results suggest that all three forms of formal ownership (i.e. employee participation in profit sharing, decision making, access to business information) were positively related to their psychological ownership of the organization.

In addition, we found that two justice perceptions fully but differentially mediate the relationships between the three formal forms of ownership and psychological ownership. This result partially confirms the argument of Wagner *et al.* (2003) that formal ownership can lead to psychological ownership through either the extrinsic model or the instrumental model. On the one hand, employees who participate in profit-sharing plans experience higher psychological ownership through the perceptions of distributive justice (the extrinsic model). On the other hand, employee participation in decision making and being granted access to business information result in a higher level of psychological ownership through procedural justice perceptions (the instrumental model). Furthermore, the present study is one of the first studies to examine the relationships between the two justice perceptions and psychological ownership. Based on the perspectives of economic exchanges and the group-value model, we found that both distributive and procedural justice were positively related to the emergence of psychological ownership, supporting the arguments that both perceived distributive and procedural justice can strengthen employees' positive attitudes towards the organization (Aryee *et al.*, 2002; Robbins *et al.*, 2000; Roch & Shanock, 2006; Tyler & Blader, 2003). Taken together, the aforementioned findings advance our understanding on why the three rights of formal ownership lead to the experience of psychological ownership for the organization (Whetten, 1989).

Finally, Pierce *et al.* (2003) and Van Dyne and Pierce (2004) have appealed for empirical studies that test the generalizability of the psychological ownership model in collectivistic cultures (e.g. China, Taiwan; Hofstede, 1997). The results of the present study serve as a response to this call in three ways. First, the factor structure of the psychological ownership measurement in this study (i.e. in a collectivist culture) is similar to studies in individualistic cultures (i.e. Van Dyne & Pierce, 2004), which provide evidence of both the conceptual and scaling equivalence of psychological ownership measurement in two different cultures (Shaffer & Riordan, 2003). Second, correlation patterns among the variables identified in this study (i.e. the correlations between participation in profit sharing, decision making, psychological ownership) are generally similar to findings based on US samples (e.g. Wagner *et al.*, 2003) or New Zealand samples (e.g. Pierce *et al.*, 2004). This indicates that the findings of formal-psychological ownership linkages in individualistic cultures (i.e. USA and New Zealand) can be generalized across collectivistic cultures (i.e. Taiwan). Third, in collectivistic cultures, the salience of cultural values may strengthen employees' desire to be trusted by the organization, as well as their sense of trust in their organization (Hofstede, 1997). Since sharing business information with employees can enhance a mutual trust between employees and employers, Pierce *et al.* (2003) proposed that the strength between the information right (i.e. access to business information) and the emergence of psychological ownership would be stronger than other rights in collectivistic cultures. In our study, we also found the correlation between access to business information and

psychological ownership of the organization to be larger than that of the other two rights (i.e. $r = .30$, after correcting for attenuation), providing preliminary evidence for this proposition.

Practical implications

In this section, we draw out some practical implications for organizations to shape the psychological ownership of employees. First, the results illustrated that participation in decision making and access to business information can be positively related to psychological ownership through the perception of procedural justice. Profit sharing, also, can be positively related to psychological ownership through the feeling of distributive justice. These results suggest that organizations can promote employees' psychological ownership by implementing formal ownership programmes. Therefore, organizations should ensure that they do not limit themselves not only to implementing employee stock ownership plans and providing periodical business information (e.g. future strategies, financial performance data or important policies), but also provide employees with significant opportunities to participate in work-related decision making. In particular, as employee justice perceptions also influence the emergence of psychological ownership, it is critical for organizations to assess how employees perceive the distributive and procedural fairness of these programmes by conducting employee opinion surveys or the compliant system.

Limitations and future research

A few limitations of this study should be noted. First, all variables in this study were measured using self-reports and originated from the same source. Thus, the problem of common method variance (CMV) may have influenced the results (Podsakoff & Organ, 1986). To reduce the potential effects of this problem, we referred to the suggestions made by Spector and Fox (2003) emphasizing the use of fact-based and specific items (i.e. three employee ownership systems) to minimize subjective (perceptual) bias. In addition, to avoid illusory correlations caused by respondents' implicit assumptions (i.e. assumptions that the measures are associated with each other, and in-turn allowing these assumptions to influence their ratings; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), we simplified the descriptions of each scale, and tried to make it appear that connections between the measures of both predictor and criterion variables did not exist.

After data collection, we conducted CFA to detect the severity of CMV (see Korsgaard & Roberson, 1995). If CMV had been a significant problem in this study, then the 1-factor model would have fit the data as well as the proposed model. However, as we mentioned in the results section, the proposed 6-factor model provided a better fit than the 1-factor model. This suggests that the issue of CMV did not adversely or significantly influence our findings.

The second limitation concerns the difficulty of making causal inferences from the cross-sectional design. Given the cross-sectional nature of our study, we cannot unequivocally determine the direction of causality in our data. Only a replication of the present findings using a longitudinal or experimental design can establish the direction of causality. Thus, we encourage future research on this topic to confirm these findings.

The final limitation concerns the relatively low reliability of the profit-sharing measure. As a result, the relationships between participation in profit sharing and the other variables of interest may have been attenuated. However, the use of SEM helps to correct for attenuation caused by imperfect measurements (Bollen, 1989). As this study

also made use of SEM, we believe that any problems of attenuation due to low reliability were minimized.

To further extend the nomological network of the theoretical model (Schwab, 2005), we now propose some directions for future research. First, the interactive effects of the three formal ownership programmes on psychological ownership are worthy of further investigation. Rousseau and Shperling, for example, argued that profit sharing could be combined with shared financial information and participation in decision making to increase employer–employee reciprocal agreements in regard to the terms of the psychological contract. In this way, employees who participate in profit-sharing plans, participate in decision making processes and have greater access to business information experience stronger psychological ownership for the organization. Second, it may prove meaningful to examine more of the antecedents that foster the emergence of psychological ownership. For example, leaders' delegations provide employees with opportunities to exercise controls (Chen & Aryee, 2007) and to access necessary information (Lawler *et al.*, 1992), which may enhance psychological ownership via the influence and information rights. Moreover, since 'business literate' employees are more likely to understand business information and participate in decision making (Rousseau & Shperling, 2003), it would also be useful to examine whether organizational training for business literacy strengthens employees' psychological ownership by increasing their use of business information and participation in decision making (Kaarsemaker & Poutsma, 2006). Finally, we recommend an exploration of the boundary conditions of the psychological ownership model (Whetten, 1989). For example, Pierce *et al.* (2003) suggested that the strengths between formal ownership programmes and psychological ownership differ within different cultures. In individualistic cultures, the salience of cultural values may strengthen employees' desires to dominate their environment (Hofstede, 1997). As a result, the relationship between participation in decision making (i.e. the influence right) and psychological ownership of the organization is theorized to be stronger in individualistic cultures than in collectivistic cultures. Future research could test this proposition by comparing the strengths between the three formal ownership programmes and psychological ownership of the organization under different cultures (i.e. collecting samples from individualistic vs. collectivistic cultures).

In conclusion, this present study tested the links between three formal ownership programmes and psychological ownership. The findings of the present study suggest that profit-sharing plans enhance the emergence of psychological ownership through the mediation of distributive justice, while participation in decision making and access to business information increase psychological ownership through the mediation of procedural justice. Future research can establish the nomological network of psychological ownership through the examination of additional antecedents, and further explore the moderating roles of cultural differences to advance our knowledge regarding the boundary conditions of the psychological ownership model (Whetten, 1989).

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