

08 – Leadership and Governance

Competitive Session

**How Boards Resolve Information Asymmetry to Execute Their Roles: The Role
of Enterprise Resource Planning Systems**

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How Boards Resolve Information Asymmetry to Execute Their Roles: The Role of Enterprise Resource Planning Systems**ABSTRACT:**

The literature emphasized the wealth-protection and wealth-creation roles of the boards, the decisions they make, and the relatively more activism of independent directors. However, the process behind how they effectively execute their roles is under-studied. We argue that both of the wealth-protection and wealth-creation roles primarily depend on independent directors' ability to have sound knowledge and information about their firms. We claim that information technology investments, and especially Enterprise Resource Planning systems, are possible solutions to information asymmetry between independent directors and managers. We hypothesize and find that independent boards invest more in ERP systems to install top level reporting and business intelligence modules that can remedy the information asymmetry problem.

Keywords:

Corporate governance, board composition, board effectiveness, board roles, information systems.

INTRODUCTION

As part of their fiduciary responsibility to represent shareholders and maximize shareholder return, boards have two crucial roles within their firms: wealth-protection and wealth-creation (Filatotchev, Toms, & Wright, 2006; Kim & Ozdemir, 2014). These two roles require them to monitor top management's decision making while bringing in necessary resources, providing knowledge and expertise, and advising or coaching the top managers on strategic issues (Hillman & Dalziel, 2003).

Researchers have investigated the boards' involvement with big decisions inside the firm as part of these two roles. For example, Johnson, Hoskisson, and Hitt (1993) find that independent members of the board are the primary initiators of organizational structure change. Cai and Sevilir (2012) argue that the board connectedness is very important in merger and acquisition (M&A) transaction process. The better connectedness brings better corporate investments and leads to greater value creation. Similarly, Masulis, Wang, and Xie (2007) suggest that firms where chairman and CEO roles are occupied by separate boards directors, and Kroll, Walters, and Wright (2008) find that boards with relevant experience, make better M&A decisions and these M&A projects are rewarded higher in

the stock market. In the same vein, Kochhar and David (1996) find that the boards with strong monitoring capability and managerial control system are more likely to make innovation investments.

The boards need information in order to successfully accomplish these two roles of wealth-protection and wealth-creation. Their capacity to execute their roles not only depends on the knowledge, skill, expertise they hold, but also in the information they possess about the firm's operational situation and requirements (Cornelli, Kominek, & Ljungqvist, 2013). One primary source of internal information for board would be from the CEO and top management team (TMT). While CEO and TMT may be willing, in principle, to share the full information with the board members, they are also cognizant that doing so would induce more stringent monitoring (Adams & Ferreira, 2007). This results in the potential of information asymmetry problem between the TMT and the board members. Board members, being aware of the controlling power the CEO and TMT have over information, as a result, may need to turn to other potential sources (Nowak & McCabe, 2003). Information technology (IT) investments and existence of information systems within the firm is one such source that can make detailed information about the firm's operations available to the board members (Gorla, Somers, & Wong, 2010; Mithas, Ramasubbu, & Sambamurthy, 2011).

Among different IT investments a firm can do, enterprise resource planning (ERP) investments are probably the most useful one for unifying all company related information in one place (Grabski, Leech, & Schmidt, 2011). During 1990s, ERP started to be recognized and applied by companies and organizations across all of industries (Nazemi, Tarokh, & Djavanshir, 2012). ERP systems are software packages composed of many functional but sometimes-optional modules, such as human resources, supply chain, finance, production, business analytics, and business intelligence. They include multiple business processes across all functions in organizations. They require big investments, involve large number of employees, and even dictate business flow restructure and control mechanism reallocation (Bingi, Sharma, & Godla, 1999). As such, decision to invest in ERP system, and more importantly deciding which range of modules to implement, is not only a technology decision and challenge but also an important business decision (Ross & Weill, 2002).

When implemented, an ERP system can be a very powerful technology and can give managers a panoptic visibility to all organizational operations. In addition, through its high level reporting

modules, it can provide its users both cross-functional information and a sense of total control over operations. It also makes the business flows more visible within the organization (Sia, Tang, Soh, & Boh, 2002). In sum, ERP systems may prove useful for a board that is eager to monitor the activities of the CEO and TMT and/or help them with strategic decisions. However, the literature is silent on the relationship between corporate governance, and especially board structure, and the firms' desire to implement ERP systems and the different range of modules within them.

The literature argues that a board structured for monitoring and strategic advising, through independent board members and CEO-Chairman separation, would be more motivated to monitor the CEO and TMT and be involved in decision making processes within the firm. In this study, we claim that this causes the independent directors to seek extra information beyond what the CEO provides in order to resolve potential information asymmetry problem they face. We hypothesize and show that firms with such boards are more likely to make higher investments in ERP systems to install higher-level modules for this purpose.

THEORY AND HYPOTHESES

A central tenet of Corporate Governance literature is the different roles of boards within the firms and how boards execute these roles effectively. As part of their fiduciary responsibility, boards play wealth protection and/or wealth creation roles (Filatotchev et al., 2006; Kim & Ozdemir, 2014).

In their wealth protection role, the board aims to protect shareholders' wealth by preventing managers from pursuing self-interested actions for private benefits. Agency theory explains that the purpose of operating the firm may be different between the owners and the managers (Jensen & Meckling, 1976). Deutsch (2005) argues that there are three main potentially conflicting critical decision areas in firms between CEO and the owners: CEO's payment, risk the firm takes, and corporate control. The critical decisions underlying these three areas include: CEOs' incentive pay, related and unrelated diversifications, R&D expenditures, debt intensity, takeover defenses, and CEO turnover and dismissal.

Since the boards present shareholders' interest, they are suggested to monitor the actions and decisions of the TMT and the CEO in these decision areas. Therefore, the effective execution of this wealth protection role depends largely on the use of board's monitoring power (Fama & Jensen,

1983). The boards are proposed to be structured to have more independent directors and CEO and board chairman separation to obtain this power (Boyd, 1995; Hoskisson, Castleton, & Withers, 2009).

Haleblian and Rajagopalan (2006) argue that board composition and their cognition have the biggest impact on CEO dismissals. In their model, how the board collates information about firm performance and perceives it, how they attribute performance to CEO's decisions, and how effective they think the CEO is are the main determinants of this dismissal decision. They also claim that boards where CEO and chairman is the same person and boards with fewer independent directors are more likely to view firm's performance with a positive lens and less likely to dismiss the CEO. Similarly, Hermalin and Weisbach (1998) find that independent board moderates the relationship between firm performance and CEO turnover. Moreover, Capezio, Shields, and O'Donnell (2011) argue that independent boards, CEO-chairman duality, and compensation committees also moderate the relationship between firm performance and CEO compensation level and composition. All these evidences show that the independent boards are more involved with agency-based decision areas.

Another important role the boards play within the firm is wealth creation. Recent corporate governance research found that 85% of board directors agree that their main role is setting the strategic direction of the company or getting involved in setting strategy rather than just monitoring managers (Adams, Hermalin, & Weisbach, 2010). They believe that their advice raise firm value without limiting CEOs' actions (Adams & Ferreira, 2007). Corbetta and Salvato (2004) and Rutherford, Buchholtz, and Brown (2007) argue that this wealth creation role is more important than the day-to-day operational monitoring role. Resource dependency theory and strategic advising theory highlight this potentially crucial role of boards as one of providing and securing essential resources and coaching the CEO, which can directly or indirectly help firms create wealth. This kind of board is suggested to be composed of directors who have richer experiences, wider professional knowledge and links with outside firms (Kim & Ozdemir, 2014). Independent directors are more likely than the insider board members to satisfy these requirements as they usually have richer experiences and knowledge of diverse industries (Hillman, Cannella, & Paetzold, 2000).

Chen (2011) investigates the effect of independent board on internationalization decisions. His results show that independent boards moderate the link between TMT characteristics and

internationalization, which supports the view of independent board members as resource providers. Another critical decision boards involve with is innovation, which affects long-term performance of the firms and may even dictate life chances of them. While CEOs are normally hesitant to pursue risky innovation strategies, independent directors can play an encouraging and consulting role to engage in innovation investments (O'Connor & Rafferty, 2012). Based on their experiences and knowledge, the independent board is able to provide more valuable advices (Schmid, Sánchez, & Goldberg, 2014). In a study of large companies' M&A behaviors, Haunschild and Beckman (1998) observe that independent boards with their richer experience and knowledge about the industry or business are more useful. Their background and experiences allow them to better utilize their knowledge of the firm's situation. As a result, they are more likely to contribute meaningful and better advices during the M&A decision making process.

All of the above examples show how boards are heavily involved in firms' critical decisions. Thomas, Schrage, Bellin, and Marcotte (2009) cite a survey by PricewaterhouseCooper (2006) and conclude that "directors are keen to serve this role and to engage management in discussions". By linking board characteristics to firm decisions, these studies especially highlight how independent boards are more active than non-independent boards for these purposes. However, more research that investigates the process of how independent boards execute their roles within firms, rather than just the outcomes, is needed (Nicholson & Kiel, 2007).

Underlying this direction, researchers found that knowing their firms and obtaining relevant information is a crucial factor for the directors to execute both of the wealth protection and wealth creation roles. Baysinger and Hoskisson (1990) explore that directors who receive more information about the firm are more likely to provide consequential opinions. Similarly, quality, timeliness, and credibility of information the board receive highly influence their ability to provide meaningful and useful oversight (Hardin & Roland, 2006) and the quality of their decision making (Nowak & McCabe, 2003). These studies also argue that since the executive directors have superior information compared to independent directors, independent directors are at a disadvantage when evaluating complex situations and helping the firm on the decisions it has to make. Note also that stewardship theory, building on this observation, suggests that boards should not monitor managers' behavior and

decision-making or try to advise them since executives are much better informed to make decisions (Davis, Schoorman, & Donaldson, 1997). These show the significance of accessing information for effective corporate governance.

For example, Halebian and Rajagopalan (2006) discuss how critical the information the board possesses is when making CEO dismissal decisions. Their cognitive assessment of the firm's performance depends on the information they can obtain. Without the necessary information, they cannot develop expectations of firm performance and interpret it. Similarly, without necessary information, the independent directors will be unable to provide useful network resources and opinions based on their rich knowledge and experience. Adams and Ferreira (2007) highlight that an initial requirement for the board to be involved with strategy formulation is whether the CEO provides information to the board about the projects (strategies) or whether the board can obtain this information otherwise. This is also supported by Gillette, Noe, and Rebello (2003)'s laboratory experiment that shows how information transmission between CEO and board and board performance are related. The more information passed to the board, the more the board was able to contribute. Moreover, Schmidt (2008) shows this relationship empirically. He finds that if the board can obtain more information about an M&A project, they are able to provide better advice during the process and the firm is more likely to earn a higher return.

Although a board structured for wealth protection and wealth creation is more willing to execute their roles than one dominated by executive directors, (Daily, Dalton, & Cannella, 2003; Eisenhardt, 1989; Westphal & Bednar, 2005), compared with managers, the independent board members cannot easily obtain the comprehensive and detailed information about the firm and the decisions it has to make. Therein lies the root of the information asymmetry between the TMT and the independent board member. Normally the formal way for boards to gain information is from what the managers provide in their reports. These reports, however, are generally very limited and selectively compiled by managers to emphasize what they want the boards to learn, giving CEOs a strong bargaining power over the board (Dominguez-Martinez, Swank, & Visser, 2008). Thomas et al. (2009) assert that more than two-thirds of directors depend solely on the TMT for information and that independent directors are often found to be less than satisfied with the information they are given on

financial, operational, and strategic matters. Interviews presented in Nowak and McCabe (2003) succinctly highlight this problem. Their interviewees are quoted criticizing the TMT as “You are absolutely at the mercy of the Chief Executive and the management and you rely on them enormously to give you the information you need to base decisions on” and “Chief Executives ... even the good ones ... tend to want to control the flow of information to the Board”. Unless the independent directors find a way to resolve this information asymmetry, it will be very difficult for the independent directors to effectively execute their roles.

As a result, while the independent board and independent chairman are crucial for firms’ decision making, their effectiveness in executing their roles is limited by the information they can gather. Unfortunately, they sit in a very poor situation regarding accessing information. As boards recognize the limitations they are facing in obtaining the necessary information from the CEO, they will be more active in finding alternative means of information gathering. Nowak and McCabe (2003) point to some of these alternative means, such as asking probing questions, having one-to-one meetings with the executives to walk through the information, studying the industry in further detail, and even seeking independent advice. Rutherford et al. (2007) confirm that especially more independent boards will have more information seeking behavior to gain higher quality, quantity information and reliable data analysis reports of the company to reduce this information asymmetry.

To make it easier for users to obtain, collate, and present information that they may need is one of the main purposes of information technology (IT) development (Orlikowski & Baroudi, 1991). Therefore, IT investments within firms have the potential to be one such alternative mean for the board to access and gather information. For example, Thomas et al. (2009) describe results of a focus group study, wherein board members express their desire to be able to perform “what-if” analyses using company data and obtain advanced analytics. For an IT investment to fulfill this potential, it should act as a repository of all firm related information and be able to provide quick overview of the firm and its various operations in the form of easy to generate and easy to comprehend reports. One such IT system that directors and managers have certain knowledge about is Enterprise Resource Planning (ERP) systems. ERP systems have been very widely applied in all industries in recent decades. They include all functional business process and real time data. Based on these

comprehensive data, ERP systems can produce authentic large range reports, which can be customized by the users to produce relevant and reliable reports. They can even be used to compose a panoramic view of the firm dynamically (Sia et al., 2002). In addition, since 2000s, ERP systems started utilizing cloud technology. This new function potentially allows independent directors to use the ERP systems offsite, review necessary information, and interact with managers by real time, if needed (Lenart, 2011; Orlikowski & Baroudi, 1991). This can greatly strengthen the ability of the board to gather information by providing them with full and trusted information to help them analyze the situation. The ERP systems, as a result, can be used to solve the information asymmetry problem between managers and the board. They can help the board make informed decisions both for wealth protection and wealth creation purposes. However, not all ERP systems installations can satisfy this purpose.

The process of the ERP installation starts from bottom level modules towards top level modules. Bottom level modules include predominantly operational functions and useful for collecting information. Every company starts from different bottom modules for different aims, such as some firms start from accounting, some from manufacturing or supply chain. The greatest value of ERP systems for the board members would, however, be the decision making support that top level modules enable. These top-level modules include business intelligence and business analytics, data analysis, reports generation system, strategic planning system, and similar. Even though, TMT and directors may only be interested in the top level ERP modules, these are all based on the bottom levels' data and are useless without installing a number of those bottom level modules. So from a company's ERP investment amount, one can deduce the level of its ERP installation. The more ERP investment means the company's ERP installation is closer to the top level.

Therefore, we conclude that boards structured for wealth-protection and/or wealth creation, with their motivation to seek reliable and comprehensive information, will have more positive attitude towards investing more in ERP systems.

Hypothesis 1: The proportion of the independent board members will positively affect the amount of investment in ERP systems.

Hypothesis 2: The independent board chairman will positively affect the amount of investment in ERP systems.

METHODOLOGY

In order to test the hypotheses, we have collected information from a number of sources. We have obtained the data on ERP investments made by firms from the largest ERP vendor, in terms of market share, in China. We have collected the data on firms, their size, industry, and board structure from CSMAR database. This data source includes a wide range of attributes regarding Chinese firms, both listed and private, including their employee numbers, revenues, and board members. We are still in the very early stages of our data collection efforts and currently have only 20 companies, all of which are public. The companies are from 2 industries: pharmacy and fast moving consumer goods.

Dependent Variable - The Amount of ERP Investment:

In order to generate the dependent variable, we have obtained and reviewed the contracts these companies signed with the ERP vendor. As such, all of our 20 companies actually invested in ERP systems installation. However, the amount they invested and, as a result, the modules they could implement differ. The mean investment is 4.7M RMB (approx. AUD\$800K), the minimum is 1.8M, and the maximum is 11.9M RMB. While 1.8M RMB would only be enough to install part of the operational bottom level modules, in order to install the top level modules, the firms may need to perform a much higher investment of at least 5.5-6M RMB. Table 1 shows the descriptive statistics for this and other variables in our analyses.

[Insert Table 1 About Here]

Independent Variables:

We have two primary independent variables in our analyses. To collect the proportion of independent directors, from CSMAR database we have obtained the total number of directors and the number of independent directors in the year before the contract with the ERP vendor is signed. For example, for a contract entered in 2008 between Company A and the ERP vendor, we calculate the proportion of independent directors by dividing the number of independent directors Company A had in 2007 with the number of total directors they had at the time. Similarly, using the CSMAR database, we generate a dummy variable to capture if the CEO and chairman are different (coded 1) or same (coded 0) in the year prior to the contract.

Control Variables:

The literature suggests that there may be alternative explanations as to why a firm may invest higher or lower amounts in ERP systems. For example, Buonanno et al. (2005) argues that size of the firm influences how much the firm may want to invest in ERP systems. Similarly, macro-economic conditions (Liang, Saraf, Hu, & Xue, 2007) and industry setting (Masini & Van Wassenhove, 2009) may also affect ERP investment amount decisions. We capture these concerns through three control variables. We measure the size of the firm by the log of number of employees, which we collect from CSMAR database. To capture macro-economic conditions, we generate a dummy variable for period after 2009. This variable (taking on value of 1 if year is 2009 or later) is able to take into account the global financial crisis that happened starting in late 2008. Lastly, we introduce another dummy variable to represent if the firm is from pharmaceuticals industry or not.

RESULTS AND DISCUSSION

Table 2 presents the results of OLS regressions that estimate the ERP investment amount on proportion of independent directors, CEO-Chairman duality, and control variables. We include the robust t-statistics values below the coefficients.

[Insert Table 2 About Here]

In Model 1, we introduce only the control variables. We observe that, firms in pharmaceutical industry, on average, invest 2.4M RMB less than firms in FMCG industry. In China, pharmaceutical industry is highly controlled by government and there is little competition. In addition, the Chinese government enforces the firms in pharmaceutical industry to install some form of ERP system (Liang et al., 2007). We observe that, while the pharmaceutical firms install these systems, they, on average, appear to do so symbolically compared to the firms in FMCG industry where competition is much stronger and need to timely information is much higher. The period dummy control variable, while not statistically significant in this model, is negative. This means that firms reduced their ERP investments after the GFC crisis. This particular variable is negative and significant in the full model in Model 4. The number of employees, however, is always not significant in the models.

In H1, we hypothesized that boards with higher proportion of independent directors are more likely to invest more in ERP systems installations. Model 2 introduces this variable. The coefficient of independent directors' proportion is positive and significant, supporting H1. We find that each

percentage increase in this variable increases the amount of ERP investment by 140K RMB. In the data, the minimum value we observe for this variable is 14.3% while the maximum is 50%. The difference in the expected ERP investment between those two companies according to the model is 4.9M RMB. When we look back into the data, the firm with 14% independent directors made an investment of 3M RMB in 2009, while the firm with 50% independent directors made an investment of 6.9M RMB in 2010.

H2 claimed that boards where CEO and chairman are different people would be more likely to invest more in ERP systems installations. We introduce this variable in Model 3. While the direction of the coefficient is as H2 suggests, this variable is not statistically significant, failing to support H2. More interestingly, the coefficient of this variable turns negative in the full model, presented in Model 4. Model 4 includes all of the proportion of independent directors, CEO-Chairman duality, and control variables. This reversal of sign for CEO-Chairman duality variable hints at the potential substitutive effect between two internal corporate governance mechanisms of independent directors and CEO-Chairman duality (Rediker & Seth, 1995; Ward, Brown, & Rodriguez, 2009).

CONCLUSION

Board has wealth protection and wealth creation roles inside the firm. These roles, their effect on the firm's decision making, and their performance implications have been studied in many empirical cases. Our review of the literature, however, highlighted a gap in our understanding regarding the process boards go through in actually executing their roles. Only recently the literature has started focusing on this dimension (e.g. Rutherford & Buchholtz, 2007). While the literature have claimed that boards' ability to execute their roles are largely decided by the information they possess about the firm, it hasn't elucidated how the boards can obtain this information. The potential lack of information is especially crucial for independent directors, who are claimed to be more active in executing both wealth-creation and wealth-protection roles (Boyd, 1994). In this study, we aimed to contribute to the corporate governance research by empirically examining the relationship between board characteristics, especially with a focus on their independence, and their information seeking behavior. We claimed that boards with independent boards will be more motivated to seek and obtain the information they need.

As a primary alternative for the board to gather information beyond what top management team provides, we focused on information technology (IT) investments and their ability to make data and information easily available within the firm. As one of the biggest IT investments, enterprise resource planning (ERP) systems have full advantages on firm's ability to collect and analyze information. We claimed that this has the potential to help these information lacking independent directors to obtain a panoramic view of their firms. As a result, we hypothesized that independent boards will be more likely to invest in ERP systems, and more importantly, will be more likely to invest a higher amount in order to install top-level business intelligence and strategic reporting related modules of ERP applications.

Through collecting ERP investments data from an influential ERP vendor in China and firm and board characteristics data from CSMAR database, we found that the proportion of independent directors have a positive and significant effect on ERP investment amount. This confirms our hypothesis that independent boards are more motivated to gather information.

In sum, we contribute to the literature by explaining and demonstrating a process through which independent boards resolve the potential information asymmetry problem between them and the top management team. They do so by encouraging the firm to invest in higher-level modules of ERP systems. As a result, we contend that they would be able to better execute their wealth protection and wealth creation roles. Future studies should further investigate this link between information access and better execution.

A big limitation of our study is the limited data we have at this point to test the hypotheses. Our data collection is still in a very early stage. As we collect more data, we aim to include more firms from these two industries and additional firms from other industries. Moreover, we intend to collect information about not only the ERP investment amounts these firms performed but also the actual modules they have agreed to implement. The module installation information is much more cryptic in the contracts and requires us to communicate with the project leaders in the ERP vendor, and sometimes with the firm, slowing down the data collection process. While our results are very promising given the limited data we have, we expect that additional data will help us present an even stronger evidence to support our hypotheses.

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Table 1: Descriptive Statistics of the Variables in the Model

Variables	Obs.	Mean	Std.Dev.	Min	Max
ERP Investment Amount (Million RMB)	20	4.70	2.58	1.80	11.90
Proportion of Independent Directors (%)	20	35.44	8.21	14.29	50.00
Is CEO and Chairman Separate People	20	0.65	0.49	0.00	1.00
Number of Employee (logged)	20	8.33	1.02	6.32	10.18
Period Dummy (Year >= 2009)	20	0.60	0.50	0.00	1.00
Is Firm in Pharmaceutical Industry	20	0.60	0.50	0.00	1.00

Table 2: Results of OLS Regression of proportion of independent directors and CEO-Chairman Duality on investment amount the firm has done on ERP installation.

Robust t-statistics are in brackets below the coefficients.

**** p<0.01, * p<0.05, + p<0.1**

Variables	Model 1	Model 2	Model 3	Model 4
Proportion of Independent Directors (%)		0.14**		0.17*
		[3.35]		[2.41]
CEO-Chairman Duality (1 = CEO-Chairman different people)			0.16	-0.85
			[0.13]	[-0.59]
Number of Employees (logged)	-0.8	-1.09	-0.81	-1.09
	[-0.98]	[-1.35]	[-0.96]	[-1.33]
Period Dummy (Year >= 2009)	-0.82	-2.09	-0.82	-2.34+
	[-0.72]	[-1.65]	[-0.69]	[-1.91]
Is Firm in Pharmaceutical Industry	-2.39	-3.47*	-2.47	-3.23*
	[-1.69]	[-2.24]	[-1.67]	[-2.19]
Constant	13.3	12	13.3	11.8
	[1.74]	[1.69]	[1.68]	[1.66]
Observations	20	20	20	20
R-squared	0.222	0.352	0.223	0.369