Skills, Incentives, and Control

AN INTEGRATION OF AGENCY AND TRANSACTION COST APPROACHES

N. RAO KOWTHA
National University of Singapore

In recent years, agency and transaction cost approaches to incentives and control highlighted the issue of performance measurement. Although the general propositions of these economic theories have been supported in research, there are theoretical gaps with regard to the effects of uncertainty on control. Also, implications of employee skills for control have been ignored in these approaches. This article integrates the two economic approaches and develops a framework incorporating skill level as a determinant of control. Hypotheses derived from this framework were tested in two merchant shipping companies employing crews of different nationalities. The results suggest that performance ambiguity and employee skill level are significant predictors of controls. The results also indicate that the choice between behavior-based and output-based controls may be driven more by job characteristics than nationality. Using these results, implications for practice and future research are discussed.

Organizational incentive systems have been extensively investigated in control research (Balkin & Gomez-Mejia, 1984; Heneman, 1992; Lawler, 1981; Lawler & Rhode, 1976). Incentive systems must ensure an equitable distribution of rewards and align worker goals with organizational goals (Vancil, 1979). Measurement of performance is a central problem in designing effective incentive systems. Although organizations frequently use a mix of behavior rating (Latham & Wexley, 1981), absolute comparisons of employee behaviors, and results (Heneman, 1992), there has been no clear-cut scheme in human resource practice and theory for emphasizing one measure over the other.

In recent years, researchers have attempted to address the incentive problem using the economic theories of agency and transaction costs (Eisenhardt, 1988; Ouchi, 1979, 1980; Snell, 1992). These approaches provide a

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scheme for the choice of performance standards based on task characteristics and output measurability. Agency theory (Jensen & Meckling, 1976) and transaction cost economics (Williamson, 1975) have been quite influential. Much of the recent corporate control and managerial compensation literature is founded on these theories. This article uses agency and transaction cost theories to formulate and test an integrative framework of control. This framework will address some theoretical gaps that remain in the control literature as explained below.

The economic approach emphasizes the need to monitor, to measure, and to reward an employee's outputs or behaviors. The stress in this view is also on equitable rewards and the reduction of goal incongruence between the organization and the employee. The employer can choose to reward the employee for performing a set of prescribed behaviors; alternatively, he or she can reward the employee for his or her outputs. The choice depends on contextual factors such as task interdependence, uncertainty, and measurability of outputs. Agency theory examines how incentives distribute risk between the employer and the employee, and it strongly emphasizes the need to control employee shirking and assure competent performance (Eisenhardt, 1988). The transaction cost approach is more concerned with issues such as measurement of outputs, task interdependence, and the appropriate incentives (Ouchi, 1979). Empirical evidence largely supports the theoretical assertions in both streams (Anderson & Schmittlein, 1984; Eisenhardt, 1988; Govindarajan & Fisher, 1990; Jones, 1987).

Although transaction cost theory and agency theory are rooted in the same paradigm, they do not always agree in their conclusions. The transaction cost approach advocates the usage of output-based incentives if outputs can be measured, even if there is a high level of uncertainty (Govindarajan & Fisher, 1990). Agency theorists argue that uncertainty leads to less usage of output-based incentives (Eisenhardt, 1989). Some studies show that uncertainty may have a negative effect on the usage of output-based incentives (Eisenhardt, 1988; Parks & Conlon, 1995). The results are far from conclusive, though. Studies of university faculty (Gomez-Mejia & Balkin, 1992b) and managers (Kren & Kerr, 1993) show no effect of uncertainty on the usage of performance-contingent compensation. These mixed results raise the possibility of a theoretical gap.

A second problem common to both approaches pertains to the exclusive focus on monitoring (e.g., Eisenhardt, 1988; Kerr & Kren, 1992). Consequently, the relevance of an employee's skills for incentive systems has not been examined. This may have been due to the researchers borrowing only part of the basic theory. In agency theory, employee output is a function of capital, skills, uncertainty, and effort (Demski & Feltham, 1978). However,

only uncertainty, interdependence, and effort have been studied in control research so far. Skill level, the other variable, together with interdependence and uncertainty, can present a fresh set of incentive problems to the employer (Demski & Feltham, 1978; Levinthal, 1988).

A few laboratory experiments have investigated the implications of incumbent ability for compensation design (e.g., Chow, 1983; Dillard & Fisher, 1990). The results show that high-ability subjects self-select for high-risk/high-return compensation packages, thus lending some support to the case for skill level as a determinant. For some time now, behavioral researchers have emphasized that the relationship between motivation and performance is moderated by such factors as skills and task interdependence (Mitchell, 1982). The widely accepted tenet of "challenging but attainable goals" (Latham & Locke, 1979) implicitly refers to the employee's ability to reach the goals. Also, Staw (1977) argued that compensation schemes are a function of employee skills. Inasmuch as incentives are intended to be motivators, this influence of skills must be incorporated in control theory.

This article aims to integrate the agency and transaction cost approaches to control and provide a framework that includes employee skill level as a determinant of incentive systems. The principal arguments in this study are the following: (a) Incorporation of employee skill level in control theory can help in explaining the anomalous findings and reconcile the two approaches, and (b) a theory that incorporates measurability of outputs, task uncertainty, and skill level explains organizational control better than any one of these three variables. These arguments were the bases for the hypotheses of the study that were tested in two merchant shipping companies. The next section presents the theoretical background and develops the hypotheses. An integrative framework is proposed at this point. Subsequent sections present the method, data analysis and results, and discussion.

THEORETICAL BACKGROUND AND DEVELOPMENT OF HYPOTHESES

Textbooks define organizational control as the process of establishing standards, monitoring and measuring performance, evaluating outcomes, recognizing performance, or taking the necessary corrective actions (Bartol & Martin, 1994; Hill & Jones, 1993). The early control literature used a cybernetic model of organizations in which the control process was seen to proceed smoothly once the standards are established and performance is measured at some intervals. Human discretion received little attention from researchers, for an underlying assumption was that the goals of employee and

employer coincide. As Hofstede (1978) pointed out in his forceful criticism of this model, most organizational processes go out of control because the humans at the helm can choose not to act in line with organizational goals. Employees can maximize their utility by choosing to shirk, to steal, or to evade responsibility. A key step in the design of effective control systems, then, is to ensure that employee choices coincide with organizational intentions.

This problem of human agency has been closely examined by economists in the past two decades, and their results have entered organization theory in the form of transaction cost theory and agency theory. In this addition to control theory, incentives are emphasized as a means to reduce goal incongruence. The employee and employer are seen to be in a contractual relationship.

Theory typically identifies three problems in a contractual relationship: moral hazard, adverse selection, and holdup (Alchian & Woodward, 1987; Demski & Feltham, 1978). Moral hazard and adverse selection are of interest here. Moral hazard refers to the shirking/malfeasance problem when actions cannot be observed. For instance, an employee in a large group can choose to shirk because his or her actions cannot be monitored and his or her individual output cannot be precisely measured. Adverse selection can occur when the employee possesses idiosyncratic skills or private information, which might be observed but cannot be understood (Demski & Feltham, 1978; Holmstrom, 1982). This creates room for opportunistic behavior. For instance, a sales manager might know that a particular sales target is easy to reach, given some favorable conditions unknown to his or her boss (from Levinthal, 1988). The sales manager might then agree to achieving this target, falsely representing the outcome as the result of his or her ability and effort. Another example would be the falsification of credentials by a prospective employee, which cannot be verified (Eisenhardt, 1989). The efficient contract as a response to these control problems would call for either behavior control or output control (Eisenhardt, 1989).

Behavior control implies that the employee is rewarded with a fixed wage for performing appropriate behaviors (Eisenhardt, 1989). The employee can be monitored or the task can be programmed in this case (Eisenhardt, 1988). When output control is used, the employee's compensation is tied largely to the output level (Eisenhardt, 1989). Behavior and output controls are essentially incentive mechanisms that not only enable monitoring but also provide the necessary motivational force for the employee to make the expected contributions. A third type of control called clan control was described by Ouchi (1979). Clan control involves self-regulation and normative control of behavior through shared organizational norms and values (Ouchi, 1979). Clan control is used when behavior and output controls cannot be instituted. "Pure" behavior and output controls provide the theoretical ideals. Often,

there is a mix of the two forms (Ouchi, 1979). Few organizational jobs carry a "commissions-only" incentive system. Few jobs are also completely devoid of accountability for outcomes. It is also useful to remember that behavior control implies accountability for recorded or observed behaviors. Many organizations rate the behaviors of their employees for merit pay decisions (Latham & Wexley, 1981).

Three major determinants of these controls have been identified in the literature. These are performance ambiguity (Ouchi, 1980) in the transaction cost approach and observability and uncertainty (Eisenhardt, 1988) in the agency approach. The relationship between the determinants and controls is explained below.

PERFORMANCE AMBIGUITY AND CONTROL

Performance ambiguity is a measurement problem. Ouchi (1980) defined performance ambiguity as the difficulty in evaluating the employee's contribution to the final product. Under conditions of high task interdependence, product intangibility and poorly understood cause-effect relations, and evaluation of individual contributions to the final output are rendered ambiguous (Jones, 1987; Ouchi, 1980). The result cannot be attributed to the effort and competence of the individual; consequently, an equitable match between individual effort and individual earnings becomes problematic. The measurement problem, thus, can muddle up the incentive design. For instance, the free rider problem in groups has long been recognized (Albanese & Van Fleet, 1985). Similarly, in many services, product intangibility makes it difficult for the customers and supervisors to evaluate the final outputs of employees.

At *low* levels of performance ambiguity, output control can be used because the output level is a reliable measure of employee effort (Ouchi, 1980). Piece rate pay, although increasingly infrequent, is an example of output control (Lawler, 1987). Alternatively, jobs can be programmed to yield the desired results. The employee can be paid a fixed wage for performing the programmed behaviors. At *moderate* levels of performance ambiguity, behavior controls can be used through bureaucratic measures (Ouchi, 1980). Bureaucratic systems prescribe minimum required behaviors and provide a system of monitoring employee behaviors. When there is *high* performance ambiguity, output control is not preferred because clear performance standards cannot be established, and it can result in perceptions of inequity (Ouchi, 1980). At the same time, behaviors for task performance cannot be specified as cause-effect relationships are not well understood. Monitoring is also difficult under these conditions. Thus high performance ambiguity poses a problem because neither behaviors nor outputs can be determined

with any precision. Ouchi (1980) argued that clan control might be the solution in this case. In support of Ouchi's position, Jones (1987) found that increasing performance ambiguity leads to less reliance on behavioral and output controls in the service industry. In his study of managerial controls, Snell (1992) found that increasing interdependence and lack of crystallized standards had a negative impact on output and behavioral controls.

Performance ambiguity may not be the only variable affecting controls. For instance, when performance ambiguity is low, task uncertainty is negatively related to output control and positively to behavior control (Jones, 1987). In the same study, however, Jones (1987) found that task uncertainty showed a positive correlation with output controls when the employees were professionalized. Research has also shown that increasing task uncertainty and complexity result in goals and targets that are akin to output controls; professionalization of the workforce is a concomitant of such controls (Galbraith, 1977). Moreover, Ouchi (1977) noted in his earlier studies that output controls go hand in hand with professionalization. Professionalization suggests a certain level of skills. This relationship between skills and control has not been highlighted in the more recent transaction-cost-oriented framework. A similar question arises in the case of the independent marketing representative who is not employed by the organization. These "reps" are paid completely in the form of commissions, and they bear all the expenses and risk; the internalized direct sales force in organizations, on the other hand, is frequently subject to behavior control (see Anderson & Schmittlein, 1984). Although performance ambiguity explained much of the variation in the findings of Anderson and Schmittlein (1984), skill specificity was also an important predictor. Therefore, a more precise specification of the effects of performance ambiguity in conjunction with uncertainty and skills is needed.

AGENCY THEORY, UNCERTAINTY, AND CONTROL

Agency theory approaches the problem of incentives and control as a matter of risk sharing. Incentives specify the payoff rules for the employee who acts on behalf of the employer. Thus there is an element of risk with regard to outcomes and income streams in any control system. The question revolves round how this risk is shared between the employee and the employer.

In pure behavior control, the employee does not promise to bring about specific measured outcomes. He or she performs prescribed behaviors and refrains from proscribed behaviors. Rewards are tied to a verification of these behaviors through supervision or records. In short, risk is minimized for the employee with regard to his or her income. Under pure output control,

however, the employee is held accountable for specific outcomes and stands to forfeit income in the event of failure. Output control implies that the employee bears all the effects of any uncertainty associated with the outcome; hence, he or she bears all the risk (Baiman, 1982; Holmstrom, 1979).

Agency theory posits observability and uncertainty as the determinants of controls (Eisenhardt, 1988, 1989; Kren & Kerr, 1993). When observability of employee behaviors is high, behavior control can be used (Eisenhardt, 1989). When observability decreases, the employer can use output control (Eisenhardt, 1989). To this extent, agency approach agrees with Ouchi (1980). However, the shift to output control is moderated by the presence of outcome uncertainty.

According to agency theory, output control under uncertainty *might* inefficiently impose risk on the employee because he or she probably is being held accountable for events beyond his or her control (Holmstrom, 1979). The employee's output is a function of capital, skills, uncertainty, and effort (Demski & Feltham, 1978). Even when the employee is diligent, outcomes remain uncertain if there is unpredictable environmental variation and the employee does not have the skills to cope with this variation. Output control under these conditions induces suboptimal decisions by the employee, leading either to overly conservative decisions (Kerr & Kren, 1992) or a reckless deployment of resources. The net result is to vitiate the effectiveness of output control.

More important, agency theorists argue that behavior control is preferred when low-cost monitoring is possible, regardless of output measurability[1] (Baiman, 1982; Spremann, 1987). This is because the firm is purchasing labor, not outputs—and outputs are only proxies for effort. As an alternative, the employer can invest in systems to obtain information about uncertainty and consider this information and the outcomes jointly to make the pay decision if this investment meets the equimarginal principle (Holmstrom, 1979, 1982). Incremental information about unobserved effort helps the firm in understanding the reasons for employee actions and outputs (Holmstrom, 1979). This, in turn, can help in (a) reducing the employee's risk while not reducing incentives or (b) increasing incentives without increasing his or her risk (Holmstrom, 1979). Thus outcome uncertainty often shifts the incentive contract toward behavior control, meaning that a component of salary is included (Basu, Lal, Srinivasan, & Staelin, 1985; Eisenhardt, 1989). It is only when monitoring is prohibitively costly and the employee's effort can be unambiguously inferred from the output that output control should be used.

To summarize, behavior control is preferable from a risk-sharing perspective if information about employee behavior can be obtained at a low cost. Output control should be emphasized only when two conditions are met:

Monitoring should be very costly, and the employee's actions (in good faith) should affect the output level positively (Baiman, 1982; Holmstrom, 1979). This, assuming that the outputs can be measured. Interestingly, these arguments echo the behavioral viewpoint that controllability should match responsibility (Lawler & Rhode, 1976).

On this basis, Eisenhardt (1989) argued that outcome uncertainty shifts the contract toward behavior control. Evidence about the effects of uncertainty on control, however, has been mixed. Consider, for instance, the fact that many managers who face high outcome uncertainty have their pay strongly linked to performance (Kerr & Kren, 1992; Kren & Kerr, 1993; Snell, 1992). On the other hand, sales persons in retail stores are rewarded for behaviors even though the outcomes are measurable (Eisenhardt, 1988); but if the sales person is a "rep" not employed by the organization, then rewards are completely tied to outputs (Anderson & Schmittlein, 1984). Similarly, academics who conduct research with uncertain outcomes are rewarded for productivity, at least in institutions that emphasize research (Gomez-Mejia & Balkin, 1992b; Konrad & Pfeffer, 1990). The same result holds for R&D professionals in technological firms (Balkin & Gomez-Mejia, 1984). Further, laboratory simulations of the agency relation with MBA students failed to produce the negative effect of uncertainty on output control (Umanath, Ray, & Campbell, 1993). Thus the effects of uncertainty do not seem to hold universally.

Kren and Kerr (1993) explained this variation on the basis of monitoring. According to Kren and Kerr, behavior control is the norm (under high uncertainty) when the level of monitoring is high; output control is used when monitoring is low (under high uncertainty). Similarly, Govindarajan and Fisher (1990) maintained that output controls will be used under uncertainty only when behavior measurement is prohibitively costly. The explanations satisfy the conditional relation between monitoring and incentives, but they do not identify the task characteristics that preclude monitoring.

Large supervisory span of control or interdependence can be the reasons for monitoring difficulties; in other words, performance ambiguity. For instance, wage compression is often the norm in group settings because of low observability (Leventhal, 1976), which amounts to behavior control. This implies that risk is not shifted to the worker although observability is low. Similarly, Eisenhardt (1988) found that uncertainty was a better predictor of controls for sales persons in retail stores than span of control or job programmability. Why, then, are divisional managers and scientists (who are not monitored) asked to assume the risk for uncertain outcomes? One is led to suspect that there might be a relation between the individual's accountability for outcomes and his or her professed skill level. This gap remains in theory

because researchers did not consider the second necessary condition for the usage of output control: that the employee's actions should increase output level. But this output level is dependent not only on uncertainty and effort but also on the skill level (Demski & Feltham, 1978). Thus considering the problems created by specialized skills can fill the existing gaps in control theory.

SUMMARY

The organizational approach to control views performance ambiguity as the determinant of controls but does not accentuate the effects of uncertainty and skills. In the agency approach, observability and uncertainty are considered as the significant determinants of controls. However, results for the effects of uncertainty have been mixed, and existing explanations remain unsatisfactory. Two rectifications are suggested by this review: (a) an incorporation of skill level in control theory and (b) an integration between the organizational approach and agency approach. To accomplish this, a theoretical explanation about the importance of skills is needed. Such an explanation can be advanced by considering the problem of adverse selection.

ADVERSE SELECTION, SKILLS, AND CONTROL

Adverse selection arises when the agent (employee) possesses specialized skills, private information, or both (Holmstrom, 1982). Consequently, the principal (employer) cannot draw reliable inferences about agent (employee) behavior from observation. Because the employer cannot sort out the false and true representations at a tolerable cost, he or she can choose to shift the risk to the employee to induce effort, *all else held constant* (Baiman, 1982; Demski & Feltham, 1978; Levinthal, 1988). Although inferences about the true level of effort are not possible in this situation, actions and decisions can be attributed to the individual if there is a high level of autonomy that accompanies high skill level (Hackman & Oldham, 1980). Therefore, the first step in dealing with the adverse selection problem is to tie rewards to outputs. To this basic solution, task uncertainty and performance ambiguity can be progressively added.

Task uncertainty and skills. At this point, assume that performance ambiguity is low and that measured outputs are entirely the result of an individual's effort. If a task is routine (zero uncertainty and minimal skill requirement), behavioral controls such as rules can be used; alternatively, if monitoring or programming is infeasible, output control can be used (Eisenhardt, 1988). In

the latter case, risk is shifted to the worker. However, given the routine nature of the task, we can infer that the output level is completely dependent on the effort expended (Holmstrom, 1979).

When task uncertainty is high, the employer has two choices. The first one, following Thompson (1967), is to seal the employee from uncertainty by restricting his or her sphere of action through rules and procedures, as well as hierarchical referral (Galbraith, 1977). This creates an information system for monitoring behaviors, and it might prevent mishaps and malfeasance. Essentially, the job is reduced to a routine task; however, it does not always serve the employer's needs.

In any organization, there are tasks with inherent uncertainty requiring highly specialized skills. For such tasks, lack of autonomy yields the same result as restricting the behaviors of a low-skilled employee through rules. An alternative, therefore, is to engage an employee who is able to deal with the uncertainty and bring about the outcomes desired by the employer. If this option is exercised, precise evaluation of behaviors and skills is difficult (Alchian & Woodward, 1987). Information systems cannot adequately capture the deployment of skills or the responses to uncertain situations.[2] Moral hazard (shirking) because of uncertainty and adverse selection (false representation) because of skills can occur simultaneously at this point (Demski & Feltham, 1978).

Under these conditions, risk is shifted to the employee to induce effort, and output controls result (Demski & Feltham, 1978). Matching pay with performance alone does not yield a complete solution, however. The high-ability types may pose as low-ability types because the risk is reduced under behavior controls, and their welfare level is probably better under behavior control (cf. Spremann, 1987). Also, under such a system, employees of low and high ability will continue to earn their expected productivity. Thus the low-ability employee who represented him- or herself as a highly skilled worker will continue to earn a pay that matches his or her true level of productivity. This does not serve the employer well. Appeals to environmental shifts and difficulty might mitigate the threat of enforcement. Therefore, a solution is to design the contract so as to make it attractive only to those who are truly able (Levinthal, 1988). For instance, the payoff rules can include sufficiently high premiums for high performance and significant penalties for low performance (Demski & Feltham, 1978; Holmstrom, 1982). Thus, as skill levels increase, accountability increases too. In support of this argument, Dillard and Fisher (1990) and Chow (1983) found in laboratory experiments that highly skilled subjects self-select for output-based incentives. In addition, those who self-select their compensation packages appear to outperform those who are assigned to compensation packages. The authors

explained the performance differential on the basis of perceived fairness (Dillard & Fisher, 1990).

Variations in the agency findings on uncertainty can be explained in this fashion. Behavior control is used by firms if monitoring is feasible. If monitoring is infeasible, and there is no task uncertainty, output control can be used regardless of skill level (cf. Baiman, 1982; Demski & Feltham, 1978). Uncertainty might shift the contract toward behavior control, but this occurs only when it is so high that the employee could not have controlled the events. In other words, at lower skill levels, uncertainty leads to behavior control. At higher skill levels, this moderating effect of uncertainty is less pronounced. If the employee claims to have the skills needed to deal with the normal variation for a particular task, then this variation would not affect the determination of the reward system. Thus a highly professionalized sales force receives output control, regardless of uncertainty (Ouchi, 1977). The positive relationship between managerial discretion and performance-contingent pay can also be viewed as a matter of risk shifting (e.g., Rajagopalan & Finkelstein, 1990) because executives are expected to deal with uncertainty (Thompson, 1967). So is the case with the rep who assumes all the risk but earns substantial commissions (Anderson & Schmittlein, 1984). On the other hand, sales people with routine skills and operating in a highly uncertain environment receive salaries, although outputs can be measured and attributed to the individual (Eisenhardt, 1988). The requirement for usage of output control under task uncertainty is that the employee should have the skills and the autonomy to deal with the uncertainty; else, guidance through behavior specification and bureaucratic mechanisms may be needed (Argote, 1982; Galbraith, 1977). Next, the effects of performance ambiguity are incorporated.

Effects of performance ambiguity. At low levels of performance ambiguity, inferences about individual productivity pose no problem. The chief determinants at that point are skills and uncertainty, which have already been examined. When performance ambiguity is high, attribution of outcomes to the individual is ruled out. Performance ambiguity can remain high for several reasons. Group effort and poor measurement properties of the output are two reasons. Behavior controls can resolve the issue for a routine task.

However, a combination of high skills, high performance ambiguity, and high uncertainty leaves moral hazard and adverse selection unchecked. Under such conditions, behavior-based rewards dominate but control will not be through direct monitoring or rules. When skills are specialized or idiosyncratic, behavior control through monitoring and direction is costly. If high performance ambiguity is added to this, the employer loses control to a

significant extent. In this case, the emergent solution is in the form of clan control. Ouchi (1979) argued that clan control is akin to a professional culture, relying on norms and values inculcated through rigorous socialization. The internalized norms increase agent self-regulation, loyalty to the firm, and can prevent opportunistic behaviors. Thus, in the extreme condition of high levels of skill, performance ambiguity, and uncertainty, the emphasis will be on professional control.

Professional control is elegant but expensive (Ouchi, 1979). At first glance, it is an attractive alternative for it ensures pro-social and loyal behaviors. However, several conditions are needed to sustain such control systems within an organization. Long periods of socialization, firm-specific skills, and low turnover rates are necessary for professional control to be viable and cost-effective (Ouchi, 1979). It is for this reason that professional control is not immediately used in many organizational jobs.

Summarizing, low performance ambiguity is a necessary condition for output control. If performance ambiguity is low, employee skill level affects output control positively and reduces behavior control. Task uncertainty moderates the relationship between skills and control. From the agency perspective, incentives should match responsibility with ability and also sort out the truly able from those who are not. Thus agency and organizational approaches together can explain controls better than each taken alone. These arguments can be cast in a framework with three determinants and three controls. This framework is presented below.

A MODIFIED CONTROL FRAMEWORK

The framework presented here builds on the work of Ouchi (1979), Thompson (1967), and others. Hypotheses of this study correspond to this framework. Three determinants of incentive systems are identified here. These are performance ambiguity, task uncertainty, and skill level. The rationale for selecting these three independent variables was given in the preceding pages. Although several other variables such as firm strategic posture (Snell, 1992) and the institutional environment (Eisenhardt, 1988) can affect controls, they are held constant for the present purposes. Three types of controls (dependent variables) are identified: output control, behavior control, and professional control (Eisenhardt, 1989; Ouchi, 1979).

Following Ouchi (1980), performance ambiguity is defined as the degree of difficulty in evaluating the contributions of individual employees to the outcome. Task uncertainty is defined as the variation in work flow and task characteristics. The definition is consistent with the systems view of task

uncertainty (Brass, 1985; Rousseau, 1979). The variable "skill level" is defined as the level of education and professional training, following Beyer and Trice (1979) and Jones (1987). Output control is defined as the extent to which the employee's total earnings and career prospects are determined by the outcomes in his or her job. Behavior control is defined as the extent to which the employee's behaviors are directed and controlled through supervision. Finally, professional control is defined as the degree of professionalization and occupation-specific socialization.

The framework is shown in Figure 1.[3] In Cell 1 of Figure 1, all three predictors assume a low value. Under such conditions, either output control or behavior control through programming can be used (Ouchi, 1979). In Cells 3 and 4, the skill levels are high and ambiguity is low. From the explanation of the adverse selection problem given above, output control will be the result for these cells. When uncertainty is high as in Cell 4, an information system might be used in conjunction with the output-based reward system. However, given that the skills are high, accountability for outcomes will be higher.

In Cells 2 and 6 of Figure 1, uncertainty is high and skill levels are low. This results in behavior control because the employee is not equipped to deal with uncertainty. In Cell 6, the adverse selection problem is not present. But increasing performance ambiguity rules out monitoring. In such a situation, one would expect extensive use of bureaucratic mechanisms and an absence of autonomy to control behaviors (cf. Jones, 1987). Cell 5 represents the frequently observed wage compression (Leventhal, 1976). Performance ambiguity is high here although uncertainty is low. The task is routine, and performance ambiguity might arise because of output intangibility or high interdependence. In this respect, Ouchi (1980) provided the example of the production worker in a steel plant whose task may be routine but his contribution to the final product is indeterminate. Bureaucratic control and programming can coordinate and monitor in this case.

In Cell 7, high performance ambiguity leads to behavior-based rewards although task uncertainty is low and skill level is high. This situation is infrequent in organizations, performance ambiguity being the result of output intangibility or teamwork. Committee work that proliferates on university campuses perhaps characterizes this situation in which performance ambiguity is present without a doubt. Behavior control systems can direct the employees, but mutual adjustment and understanding also aid in coordination (Thompson, 1967). Such systems will be necessary because the employees falling in this cell would be expected to operate with more autonomy. Thus some professional control might also be used. In Cell 8, the combination of high performance ambiguity, skill level, and uncertainty would necessitate

	Low Task Uncertainty		*High Task Uncertainty*	
	Skill Level		*Skill Level*	
	Low	*High*	*Low*	*High*
Performance Ambiguity				
Low	Output control or behavior control	Output control	Behavior control	Output control
High	Behavior control (formalization)	Behavior control and professional control	Behavior control	Professional control

Figure 1: A Modified Framework of Organizational Control

the use of behavior-based rewards and clan systems. Therefore, usage of professional control is likely to increase with rising performance ambiguity and skill level.

HYPOTHESES

From the arguments above, increasing performance ambiguity is expected to be negatively related to output and behavior control, and positively to professional control. Therefore,

Hypothesis 1: Performance ambiguity will be related negatively to behavior control and output control, and positively to professional control.

When performance ambiguity is low, the choice between behavior and output controls depends on skill level and uncertainty. Increasing skill level results in a greater usage of output control. Task uncertainty is expected to moderate this relationship between skill level and output control. A decrease in output control will take place as uncertainty increases, but uncertainty is not expected to have any main effects. Thus,

Hypothesis 2: Skill level will be positively related to output control and negatively to behavior control.

Hypothesis 3: Task uncertainty will moderate the relationship between skill level and output control such that increasing task uncertainty leads to a decreasing usage of output control.

High performance ambiguity can be dealt with by restricting the employee behaviors to a known set, thus removing the scope for opportunism to some extent. However, as the skill level of the employee increases, such restriction is dysfunctional. Therefore, the need for using professional control increases with an increase in skill level. Therefore,

Hypothesis 4: Skill level will moderate the relationship between performance ambiguity and professional control such that the relationship will be stronger under high skill level than under low skill level.

METHOD

The study was conducted using the survey research method (Dillman, 1978). The data for this study were from a larger study. Officers and technicians of two merchant shipping companies provided the data. The first company (Firm 1) operates 11 motor ships. This firm operates from the United States but flies the Liberian flag, a flag of convenience. The second company (Firm 2) is an autonomous subsidiary of a large petroleum firm, with five steam tankers. This firm flies the American flag. The resulting difference is that Firm 1 employs expatriate officers from India and Burma, and Firm 2 employs only American citizens or permanent residents. Firm 1 employs about 280 people on board its ships at any given time, and Firm 2 employs 150 people. The total number of officers and technicians in Firm 1 is approximately 165, and in Firm 2, approximately 90. These estimates are close to the real strength, which varies because of periodic disembarkments. The shore staff are minimal in both companies.

Questionnaires were mailed to the crews on board the ships through the company headquarters. The respondents were instructed to place the completed questionnaire in an envelope and sign across the flap of the envelope. The completed questionnaires were collected on each ship by the captain and mailed back to the investigator through the head office. One hundred and four usable questionnaires were returned from Firm 1 (63%), and 41 usable questionnaires were returned by the crews of Firm 2 (46%). It was originally planned to collect data from the shore staff such as marine superintendents for validation. However, the busy itineraries of a lean shore staff in the two companies did not permit such data collection. In-depth interviews conducted with the personnel managers of the firms corroborated the survey data albeit at a superficial level.

MEASURES

Performance ambiguity was operationalized by using observability, supervisor's knowledge of the task, and task interdependence as guidelines (Jones, 1987; Ouchi, 1980). A 7-point Likert-type scale consisting of 7 items was constructed ($\alpha = .83$). The response range for the scale was from *never* to *always*. Task uncertainty was measured by tapping into input, conversion, and output uncertainties (Brass, 1985; Rousseau, 1979). The measure comprised 7 items and was similar to the performance ambiguity scale in response range ($\alpha = .71$). Skill level was measured by inquiring into the required education level, specialized training, and level of certification ($\alpha = .61$). Certificates of competency are necessary for seafarers to be promoted in their jobs in both the firms. These certificates represent a level of skill.

The dependent variables were also measured on a 7-point scale with response ranges from *strongly agree* to *strongly disagree*. Output control was measured with 6 items by asking the respondents about performance-based bonuses, accountability for outcomes, consequences of performing below standards, and merit pay increases ($\alpha = .63$). Behavior control was measured with 6 items about direct supervision and lack of autonomy ($\alpha = .84$). Similar measures were used in the past by researchers (e.g., Eisenhardt, 1988; Jones, 1987; Snell, 1992). Finally, professional control was measured with 4 items, which asked about the degree of specialization in training and the rigor of socialization during this training ($\alpha = .60$). Size of the firm was measured as the natural logarithm of the total number of employees in each firm (Snell, 1992). Details of the scales are provided in the appendix.

DATA ANALYSIS AND RESULTS

Table 1 shows the summary statistics for various measures. The English language proficiency of the respondents has a mean of 3.5 on a 5-point scale, showing that there was no problem of a language barrier.

The hypotheses were tested using hierarchical regression methods (Cohen & Cohen, 1983). Two dummy variables called "firm" and "nation" (nationality) were created to tap any residual differences not captured by size. The control variables were entered first, and then the three independent variables were entered as a set to test for main effects (Cohen & Cohen, 1983). For the moderator hypotheses, the products of the independent variables were entered as a set, following the entry of the independent variables (Stone & Hollenbeck, 1984). As expected, the control variables for firm, size, and nationality emerged as substitutes for each other; that is, the information

TABLE 1
Descriptive Statistics and Correlations of Variables (N = 145)

Variable	M	SD	Correlations[a] 1	2	3	4	5	6
1. Skill level	5.23	1.18	(0.61)					
2. Performance ambiguity	2.96	1.29	0.07	(0.83)				
3. Task uncertainty	2.40	0.73	–0.14	0.06	(0.71)			
4. Behavior control	3.35	1.60	–0.46**	–0.44**	0.14	(0.84)		
5. Output control	3.77	0.99	0.24**	–0.11	–0.08	–0.04	(0.63)	
6. Professional control	5.62	0.94	0.12	–0.08	–0.17*	–0.02	0.19*	(0.60)

a. Parenthesized values in the diagonal are coefficient alphas; N varied between 139 and 145.
*$p < .05$; **$p < .01$.

supplied by any one of these variables captured any firm-specific effects fully, with the other two obtaining a very low regression coefficient. Therefore, only the control variable "firm" was retained for subsequent analysis. The results are shown in Table 2.

The overall results show that the skill level and performance ambiguity affect output control significantly. The increment in R^2 (.077), which is due to the independent variables, is significant ($F_{change} = 2.95, p < .05$) as shown in equation 2 of Table 2. They also have a significant effect on behavior control ($R^2 = .40, F_{change} = 31.2, p < .01$). The results for professional control, however, are not in the predicted direction (equations 8-9, Table 2). The results are discussed below sequentially.

Hypothesis 1. It was predicted that performance ambiguity will be negatively related to output control and behavior control, and positively to professional control. The results of output control in equation 2 of Table 2 show that the partial regression coefficient for performance ambiguity is negative and marginally significant at the .1 level (B = –.11, t = –1.74). Similarly, equation 5 shows that performance ambiguity is negatively related to behavior control (B = –0.52, t = –6.5, $p < .001$). However, performance ambiguity shows no effect on professional control. This indicates that Hypothesis 1 is only partially supported.

Hypothesis 2. Equation 2 of Table 2 shows that skill level is positively related to output control (B = 0.21, t = 2.9, $p < .005$). Similarly, equation 5 shows that skill level is negatively related to behavior control as predicted (B = –0.56, t = –6.2, $p < .001$). These results support Hypothesis 2.

TABLE 2

Results of Hierarchical Regression for Controls ($N = 145$)

	Dependent Variables								
	Output Control			*Behavior Control*			*Professional Control*		
Independent Variables	*Eq.*[a] *1*	*Eq. 2*	*Eq. 3*	*Eq. 4*	*Eq. 5*	*Eq. 6*	*Eq. 7*	*Eq. 8*	*Eq. 9*
1. Firm	–0.26	–0.28	–0.15	–0.16	–0.32	–0.40	–0.87**	–0.89**	–0.88
2. Skill level		0.21**	0.05		–0.56**	–0.34		0.10†	0.16
3. Performance ambiguity		–0.11†	0.51		–0.52**	–1.22†		–0.08	0.09
4. Task uncertainty		–0.02	0.98		0.27†	0.54			
5. Skill Level × Performance Ambiguity			–0.12**			0.08			–0.18
6. Skill Level × Task Uncertainty			–0.19†			0.07			
7. Performance Ambiguity × Task Uncertainty			0.01			0.072			
R^2	.014	.091	.147	.002	.40	.415	.173	.202	.203
F	2.14	3.52**	3.35**	0.305	23.6**	13.8**	30.1**	11.9**	8.9**
df	1, 143	4, 140	7, 137	1, 143	4, 140	7, 137	1, 143	3, 141	4, 140
ΔR^2		.077	.055		.40	.013		.029	.001
ΔF		2.95*	2.94*		31.2**	0.971		2.56	0.18

a. Equation number.

*$p < .05$; **$p < .01$; †$p < .10$.

Hypothesis 3. This is a moderator hypothesis, predicting that uncertainty will negatively moderate the relationship between skill level and output control. Equation 3 of Table 2 shows that the interactive effect of uncertainty and skill level is in the predicted direction, although marginally significant ($B = -.192$, $t = -1.77$, $p < .1$). The overall increment in R^2 at .055 is relatively sizable and significant ($F_{change} = 2.94$, $p < .05$). These results lend some support to Hypothesis 3. It would be reasonable to expect that this interaction (Low Skills × High Uncertainty / High Skills × Low Uncertainty) might have a significant effect on behavior control also, although such a prediction was not made. However, no such interactive effect was found for behavior control as can be seen in equation 6 of Table 2. Although not predicted, an interesting finding is the significant negative interaction of performance ambiguity and skill level ($B = -0.12$, $t = -2.4$, $p < .05$). This will be discussed later.

Hypothesis 4. Equations 8 and 9 of Table 2 show the results for professional control. The interaction of skill level and performance ambiguity shows no effect on professional control. This result disconfirms Hypothesis 4. Skill level is marginally related to professional control, but this must be routinely expected. On the other hand, there are highly significant firm-specific differences ($B = -0.87$, $t = -5.5$, $p < .001$) deserving a detailed consideration.

To summarize, Hypotheses 2 and 3 were supported, whereas Hypothesis 1 received only partial support. Hypothesis 4 was rejected. These results are discussed below.

DISCUSSION

This study attempted to integrate the agency and transaction cost approaches to control by incorporating employee skill level as a determinant in the existing framework (Ouchi, 1979). The results show that skill level raises the accountability for outcomes as argued by agency theorists (Levinthal, 1988; Spremann, 1987). The findings also replicate past evidence that performance ambiguity is negatively related to output and behavior controls (Jones, 1987; Snell, 1992). The findings also show that task uncertainty can relax the linkage between skill level and output control to some extent. The important point is that risk is shifted to the employee if he or she claims to have the skills to control the uncertainty and bring about favorable outcomes (Levinthal, 1988).

The results suggest that task uncertainty may not be an important predictor of reward systems as are skill level and performance ambiguity. Task variation might have significance for formalization and lack of autonomy (cf. Galbraith, 1977). The main effect of task uncertainty (equation 5, Table 2; $B = 0.27$, $p < .1$) indicates that increasing uncertainty might prompt more supervision or more effort by the employer to collect incremental information about employee behavior. However, task uncertainty has no direct relation to output control. The explanation offered here might help to reconcile contradictory findings in the past. University faculty (Gomez-Mejia & Balkin, 1992b; Konrad & Pfeffer, 1990), managers (Kerr & Kren, 1992), and R&D scientists (Balkin & Gomez-Mejia, 1984) are held accountable for outcomes because they contract to control the uncertainty in their jobs and produce. On the other hand, when uncertainty arises in a routine job, accountability for the outcomes will be low. Employee behaviors might be restricted to a predetermined set as a response to this uncertainty.

The results also highlight the importance of performance ambiguity. Even when skill levels are high, performance ambiguity reduces the probability of output control as seen in the negative effect of its interaction with skill level. Thus performance ambiguity appears to be the most important variable for consideration by control theorists. As I have noted earlier, the divergence between the organizational and agency approaches to control arises from omission of variables. Considering performance ambiguity, skill level, and task uncertainty simultaneously can link the two approaches and fill the gaps left by contradictory findings with regard to uncertainty.

The arguments developed here offer an alternative to the untested integrative framework proposed by Govindarajan and Fisher (1990). Their framework was based on three dimensions: behavior measurement, output measurement, and task programmability. According to that framework, output controls should be used when behavior measurement is extremely costly. One suspects that task programmability and behavior measurement will collapse into a single dimension in several cases. Even if that is not the case, the problems of interdependence and skills are not sufficiently addressed by Govindarajan and Fisher (1990). A reconciliation can be effected by observing that behavior measurement becomes extremely costly when uncertainty combines with a high level of skills. Thus one might get to the root of the problem rather than leaving it at the surface level of behavior measurement. A test of competing hypotheses can increase the confidence in their explanation or the one offered here.

LIMITATIONS

More confidence could have been placed in the findings here if the constructs were validated as planned through structured interviews with the shore supervisory staff. However, the in-depth interviews with the personnel managers served to remove some of the concerns because these managers are intimately familiar with the operations, given the small sizes of the two firms. The survey was carefully administered to ensure confidentiality that is necessary for valid responses in the peculiar setting of this study. Many of the constructs measured here were drawn from previous research and adapted for this study. With the exception of professional control, other constructs do not appear to be seriously flawed.

The results here can be regarded as only a first step in testing the theory presented here. They cannot be generalized for reasons of sample specificity and limited evidence. However, the rationale for the hypotheses draws on research in diverse settings. Thus there is reason to hope that these findings can be replicated and improved in other settings. Future research can attempt to ascertain over a diverse range of professions the effect of skills on incentives after partialing out unrelated effects. At the same time, the findings here can be subjected to more robust testing over a number of firms.

The findings here are also limited by the fact that the shipping industry is characterized by institutionalized practices and traditions (Donn, 1988; Forsyth, 1989). This may be the reason for the weaker-than-expected effects of predictor variables. For instance, the effect of performance ambiguity and the interactive effect of skills and uncertainty on output control are only marginally significant. Although performance ambiguity has been shown to be an important predictor in other studies, it did not fare as well here. The incentive systems in the sample organizations appear to be driven more by habit than by a constant review of system effectiveness. More confidence can be placed in the arguments when such influences are filtered out by replication. Another limitation to the study is that the strategic posture of the firms was assumed away. Although this might not have affected the results for this sample of respondents, at the managerial level, strategic posture could have a significant influence on reward systems (Snell, 1992). Future studies should incorporate these measures for improvement.

Professional control. Professional control was expected to be positively related to performance ambiguity. Although a sound theoretical basis for this expectation has been provided by Ouchi (1980) and Jones (1987), the lack

of support here might have been due to three reasons. First is the defective measure. Coupled with a low internal consistency (0.60), the items might have failed to tap into the intended construct. For instance, questions about the values imparted during the training might have elicited scattered responses from technicians and officers. Also, social desirability effects could have raised the mean to a considerably high level in comparison with other variables ($M = 5.6$). A second reason could be the differences between the respondent groups. The firm-specific differences show that respondents of Firm 1 employing expatriates report a higher level of socialization. The American respondents possess no dissimilar characteristics in terms of education, training, and experience. This was confirmed by data analysis of subgroups and my interviews with the personnel managers. However, disenchantment with the profession might have been prevalent in the American case as some researchers in this area have reported (Donn, 1988; Forsyth, 1989). This disenchantment might have found its way into items that do not entirely permit objective responses. Also, cross-cultural research has shown that Indians and Burmese are more collectivistic than the American sample (Hofstede, 1980). The Asian sample in this study, thus, might have been more inclined to internalize certain values and be indoctrinated into notions of professional solidarity. Unfortunately, the cultural aspect was not measured in this study.

Hence the absence of any finding here could be highly sample specific; or it could be due to cultural reasons. However, it also must be pointed out that other efforts to locate the determinants of professional control neither have obtained any significant results (e.g., Govindarajan & Fisher, 1990; Snell, 1992). One reason could be that socialization is often used as an auxiliary control rather than a principal control mechanism (Govindarajan & Fisher, 1990). It should not be surprising, then, that skill level is positively related to professional control. Organizations expect some level of certification and training for prospective employees in certain jobs as a guarantee of quality. The costs of certification and training might be shifted to the incumbent if the skills are not firm specific; else, the organization can choose to institute its own socialization efforts. Future efforts can formulate a more extensive and careful measure for this type of control and test the possibility.

IMPLICATIONS FOR PRACTICE

Incentive system design has to take into account both equity and administrative costs. The incentive system should distribute risk such that the employee will be motivated and not intimidated by the odds against him. The perspective presented here addresses these considerations and adds to what is already known to human resource practitioners. Incentive design has to

take into account the skill requirements, uncertainty, relevance of the evaluation criteria, and, more important, the measurability of these criteria. The interactive effects of the three determinants appear to be stronger than the individual variables.

Three main points with regard to risk and control summarize the present approach. First, if behaviors can be observed (or recorded) easily and reliably, then evaluating behaviors is preferable to rating outputs. When behaviors can be as easily rated as outputs are measured, it is better to reduce the risk for the employee by using behavior control. This has a salutary effect on motivation as well as psychological well-being. Behavior control need not imply a relentless and offensive supervisory patrol; it implies various mechanisms such as detailed records and reports, deadlines, frequent feedback, and supportive supervision.

Second, output control should be used only when monitoring is extremely costly *and* the employee has the skills to cope with the task. It is important to note that both conditions must be met for the usage of output control. We also must be able to measure individual outputs without any ambiguity. If group outputs are measured, a group incentive plan is more appropriate than individual incentives. However, this accountability must be moderated with a concern for significant environmental changes. Administrators must be flexible enough to allow for some shortfall in performance if some major changes could have affected the employee's outputs despite his or her best efforts. An information system that verifies the key behaviors of the employee can help supervisors and administrators to be more flexible. Absent such information, supervisors and employees may be tempted to take a rigid stance toward output-based incentives, creating a "lose-lose" situation. Employees may be driven to maximize short-run outcomes at the expense of long-run organizational health. Conversely, administrators also must be wary of setting easy targets coupled with disproportionately high rewards. In either case, the purpose of output control is not served.

A third point implicit in the theory is that risk should be borne by those who can alter the odds of the outcome. If the employee is better placed (or claims to be) than others to bring about certain results, he or she should bear the risk. But the organization must compensate the employee with a higher pay and bonus for assuming this risk. The penalties for failure should also be significant to deter people from making false claims.[4] Thus output control can be effective in promoting motivation and pay satisfaction (cf. Heneman, Greenberger, & Strasser, 1988; Miceli, Jung, Near, & Greenberger, 1991), but it should be deployed after a careful analysis of the situation.

There is a frequent complaint that pay-for-performance and merit pay plans do not work (Bassett, 1994; Wilkerson, 1995). Categorical denuncia-

tion of performance-contingent incentives may be a mistake, given that many organizations seem to have had a favorable experience with such plans (Gomez-Mejia & Balkin, 1992b). Nor is an unqualified advocacy of such plans warranted. Both sides ignore some of the important considerations outlined in this article. The most important issue is measurement. Managers value measurement for it simplifies a number of things; this has the perverse effect of measuring what cannot be measured (Kerr, 1975). Ratings of certain behaviors give some indication of performance on the job. This is familiar to most human resource professionals. Also, even in the less quantifiable jobs such as the clerical ones, experienced supervisors are able to form a rough index of how much work can get done after a hard day's work. Such ratings, however, should not be used as measures of outputs; instead, they can be used as additional information on the employee's performance over time. These subjective measures are frequently used by companies to evaluate employees (Lawler, 1981). The problem is aggravated when administrators tie these ratings to incentives with precise formulas, linking individual or group productivity to corporate performance in volatile markets (Wellbourne & Gomez-Mejia, 1988). Consequently, the plans have a negative effect on employee motivation. The link should be carefully established between individual effort and results at the individual level.

On the other hand, if behavior control is formulated as a rule bound, rigid bureaucracy, it produces only minimum required, noninnovative behaviors. Behavior control can be used creatively to enable and motivate employees. It rarely implies absolute lack of accountability. As I have indicated above, behavioral measures or mental indices, on the average, serve as approximations and additional information. Misuse of behavior control also occurs frequently through despotic monitoring even with output controls. This is an inefficient usage of output control. The case against "pure" behavior control has been made quite well by the critics of bureaucracy to need recapitulation here. Output control, on the other hand, is often seen as a mechanism that aligns employee and organizational goals, and sometimes as a booster of productivity.

Recent debacles in the financial sector, however, reinforce the case against an overemphasis on output control. Nick Leeson, the trader who reportedly caused the collapse of the Barings Bank, was driven to show performance and profits as most traders are (Rawnsley, 1995). This emphasis on the bottom line was reportedly coupled with lax bureaucratic controls to the extent that Leeson could borrow huge amounts from financial institutions without authorization from his immediate supervisors. In a classic case of escalating commitment, he used the funds to get deeper into the market, hoping that the Japanese stock markets would rebound in early 1995. Few members of the bank's top management understood the derivatives market in which Leeson

was operating; yet, he was given a free hand with all the resources for promised results that did not materialize.

A similar story comes out of the metal market tumble in London attributed to Mr. Hamanaka, a trader of the Sumitomo group ("Coming a Cropper," 1996). In both cases, an emphasis on outcomes and lax monitoring led to the employee's escalating commitment and reckless deployment of resources, with dire consequences for the organization and self. The lesson here is that output controls should be accompanied by some monitoring to prevent reckless behavior and, where necessary, protect the employee from needless penalties. In practice, output control should always be accompanied by some information and auditing system for verifying key behaviors; similarly, behavior control should be accompanied by some experience-based index of productivity.

Pay-for-performance or other output-based incentives will work only when the firm shares the effects of uncertainty by imparting skills to existing employees or by hiring skilled labor. A similar point can be made with regard to skill-based pay. Organizations may be reluctant to pay merely for the acquisition of skills, which may not be deployed at all. Skill-based pay appears to benefit both productivity and worker attitudes when teamwork is emphasized, tasks are complex, and the workers are able to use their multiple skills (Snell & Dean, 1994; Gomez-Mejia & Balkin, 1992a; Lawler, 1987). This has also been the Japanese experience, where firms have emphasized multiple skills and teamwork for a long time now (Aoki, 1988).

These points are relevant in today's environment of TQM and learning organizations. For instance, Snell and Dean (1994) studied compensation systems in integrated manufacturing settings. They found that skill-based pay was positively correlated with uncertainty; however, the interactive effects of uncertainty, TQM, and JIT were much stronger and showed a tendency toward seniority-based pay. This can be explained, *in part*, on the basis of the framework here that considers the interactive effects of performance ambiguity, skills, and uncertainty. TQM and JIT raise measurement problems because of extreme interdependence and demands for cooperation. This reduces the emphasis on output control. At the same time, worker investment in skills is accompanied by incentives.

Many TQM experts agree that performance-contingent pay for the individual poses several problems in the TQM system (Hackman &Wageman, 1995; Ishikawa, 1985; Deming, 1986). Sitkin, Sutcliffe, and Schroeder (1994) identified two aspects of TQM in practice: a quality control orientation and a customer-focused orientation that emphasizes learning. They argued that during times of rapid change, the control orientation of TQM has to be abandoned in favor of an environment that enhances learning. The required

cooperation level and collective effort in a TQM system under uncertainty blur the measurement of individual contributions; indeed, such measurement may actually cause resentment and demotivate employees. Group incentive plans or organization-wide bonuses have a better chance to succeed under such circumstances (Ishikawa, 1985). As Lawler (1987) pointed out, excessive output controls can unwittingly cause ruinous competition and weaken cooperation levels. It is possible that many firms have realized this aspect in the TQM environment.

The framework presented here should be viewed with some caution at this stage, owing to the sample and limited evidence. Nonetheless, the logical foundations of the framework are sound. As I have noted in the discussion above, the framework also explains conflicting results from studies of managers, sales persons, and academics. Also, when this study is viewed along with related studies (Chow, 1983; Dillard & Fisher, 1990) and the motivational literature (Lawler & Nadler, 1983; O'Reilly & Chatman, 1994), a strong case can be made that employee skill level is very important in designing incentives. The article's perspective also meshes with the existing literature on pay for performance. Although the economic and behavioral assumptions are different, their conclusions do not collide. However, the present framework is limited in that it does not specify *how much* or *what* is to be paid. An incentive system can comprise a host of rewards and punishments, including salary increases, pay cuts, merit increases, gain sharing, promotions, and seniority-based pay. The framework should be used with existing behavioral literature that closely examines incentive plans and compensation packages (Heneman, 1992; Milkovich & Wigdor, 1991; Gomez-Mejia & Balkin, 1992a).

Although the theory appears to favor behavior control on the surface, the question is not about which of the two is better. The question concerns the selection of a control system that matches the strategy of the firm, environmental conditions, and task characteristics while maintaining goal alignment and perceptions of equity. The congruence between these elements impacts on individual and firm performance. Strategy and environment drive the technologies used in the organization, which, in turn, influence task characteristics. For instance, Wright, Smart, and McMahan (1995) found that the match between individual player skills and preferred strategy of the team coach determined the success of National Collegiate Athletic Association (NCAA) basketball teams. Balkin and Gomez-Mejia (1992) found that the compensation packages of executives varied with the diversification strategy of the firm. To reiterate, one has to select behavior or output control, depending on measurement properties of task outcomes, uncertainty, and employee skills.

What are the cross-cultural implications of this study? Although the nationalities of the crews in the current sample differ, there appears to be a pattern across the organizations in terms of control systems. Thus environment and technology as represented in uncertainty, skills, and performance ambiguity may have uniform effects across cultures. Other studies in this line also do not show significant differences across cultures with regard to the usage of such controls, although Japanese firms seem to stress the long-term aspect (Chow, Shields, & Chan, 1991; Ueno & Sekaran, 1993). More important, the Chinese, who are known to be highly collectivistic, seem to prefer differentiated and individualized reward systems and express more satisfaction with such rewards (Chen, 1995).

This pattern, however, might not hold when it comes to socialization and clan control as the unsupported hypothesis would indicate. The results of this study do not throw much light on the determinants and outcomes of professional control. The only inference we can draw in this study is that the Asians indicated a higher level of professional control than the American respondents. Nonetheless, certification and professional training help in improving the quality of inputs to the organization, in any part of the world. Moreover, the reputational effects from a dense and active professional network can be effective motivators for professionals to excel. They also act as deterrents of opportunistic behavior. Researchers fondly observe that Asian cultures tend to be more collectivistic, leading to voluntary cooperation and in-group sanctions against shirking (Cox, Lobel, & McLeod, 1991; Hofstede, 1980). Earley (1994) also found that group-focused training is more effective in collectivist cultures as opposed to training that emphasizes individual abilities. Thus these cultures may have in-built mechanisms that yield the same results as clan control; however, such cooperative behaviors are elicited only when the team is composed of in-group members (Earley, 1993). Whether organizations operating in the global context should include only in-group members in different settings is both a utilitarian and ethical question, beyond the scope of this article. It is also worth noting that the results from cross-cultural research on cooperation and in-group behavior are hardly conclusive at this point. Administrators may do well by understanding local conditions in making these decisions than to overly generalize, especially in Asia with its mosaic of cultures.

CONCLUSION

Motivational theories have for long recognized the importance of skills. However, skills suffered from relative neglect in the control literature. To this

extent, I hope that this article will stimulate further research on skills, incentives, and organizational outcomes. Future research should examine if a more parsimonious model can be derived. It should also examine the organizational outcomes of incentive systems based on such frameworks, in terms of higher productivity and pay satisfaction. The fundamental formulations of agency theory strive to be precise with mathematical modeling; however, the emergent solutions are simple enough to be useful to everyone. Technical terms such as *moral hazard* carry a negative connotation, whereas economic theory is more benign toward agents. It acknowledges the risk inherent in work and seeks a "win-win" solution. The framework presented here can be highly useful when viewed in that light.

APPENDIX

A 7-point Likert-type scale was used to assess the independent variables of performance ambiguity and task uncertainty, and the dependent variables of behavior, output, and professional controls. The points for performance ambiguity ranged from *never* to *always*. For task uncertainty and behavior control, the points ranged from *always* to *never*. For output and professional control, the range was from *strongly disagree* to *strongly agree*.

Performance Ambiguity

1. My supervisor can easily know what exactly I am doing.
2. My supervisor can easily tell if I am doing my share of the job.
3. My supervisor can easily tell if someone in my group is shirking (lazing about/goofing off).
4. My supervisor can look at the work and easily tell who did what and how much.
5. My supervisor knows how I have to do my job.
6. My supervisor can watch and tell if I am doing my job the right way.
7. If some damage is done during the work, my supervisor can easily tell who is responsible for it.

Task Uncertainty

1. On a given day, I know exactly what type of work to expect (e.g., routine work, maintenance work, breakdown work, etc.).

2. On a given day, I know *when* (at what time) this work needs to be done.
3. When there is a problem, it is difficult to understand the nature of the problem and what caused it. (R)
4. These problems are difficult and take time to solve. (R)
5. I know all the techniques and procedures needed to do my job, in any situation.
6. I know when the job is going to be finished.
7. In this job, even if good effort is put in, I *cannot* be sure of the results. (R)

Behavior Control

1. My supervisor personally tells me what job I have to do on a given day.
2. I only have to get my job done. How I do that is up to me. (R)
3. My supervisor takes rounds to see what I am doing.
4. I report to my supervisor after finishing the day's work.
5. My supervisor inspects my work after I have completed it.
6. I can schedule my work flexibly on my own. (R)

Output Control

1. The outcomes (results) of my work affect how much I earn during my career, if not today.
2. If I perform well on my job, I get additional incentives (e.g., increments, awards, etc.).
3. My total pay will increase *only* if I perform well on my job (including fringe benefits).
4. Doing my job any better will *not* change my pay. (R)
5. Chances of a promotion are better if I do well on my job performance standards.
6. Doing my job any better will *not* change my status (rank). (R)

Professional Control

1. My professional training has given me a unique set of values.
2. During the training, I learned how to behave and what my profession means.
3. The training prepared me *exclusively* for this profession.
4. During the training, senior people guided me through the process.

(continued)

Skill Level

Skill level was assessed by the following three questions. Care was taken to confirm with the personnel managers of the firms that the gradation of the certification as shown below conforms to the perceived hierarchy of certificates in the profession.

1. What is the level of education required for this job?

[ ] 1	[ ] 2	[ ] 3	[ ] 4	[ ] 5	[ ] 6	[ ] 7
No schooling required	Secondary school	High school	Trade school	2-year college/ equivalent	4-year college/ equivalent	Technical/ professional degree

2. Please indicate the nature of the training that you have gone through for this job. Please read all the choices before answering the question. (Check one.)

I received no training at all	1 [ ]
I completed some training in basic skills	2 [ ]
I completed some general education, which is available anywhere	3 [ ]
My training is *somewhat* specialized, but it is available in many schools/places	4 [ ]
My training is *somewhat* specialized, and it is available in very few schools/places	5 [ ]
My training is *highly* specialized, but it is available in many schools/places	6 [ ]
My training is *highly* specialized, and it is available in very few schools/places	7 [ ]

3. What is your current level of certification?

None	1 [ ]
Pumpman/steward	2 [ ]
Welder/mechanic/equivalent	3 [ ]
III mate/ II class engineer Part A/wireless operator/equivalent	4 [ ]
II mate/ II class engineer Part B/ radio officer/Federal Communications Commission (FCC) license/equivalent	5 [ ]
I mate/ I class engineer Part A/equivalent	6 [ ]
Master/ I class engineer Part B/equivalent	7 [ ]

NOTES

1. The assumption is that the firm is risk neutral and the employee is risk averse. A risk-neutral employee will be indifferent to output control (see Shavell, 1979).

2. On paper, the means to monitor are unlimited. However, the firm will have to pay a substantial premium to the employees if the employees were to tolerate such methods (Spremann, 1987); the employees may refuse to tolerate some methods at all whatever the price.

3. Note that the results of the framework are similar to the one offered by Govindarajan and Fisher (1990), although the dimensions are different. Output control results in only three cells (Figure 1; cells 1, 3, and 4) as was the case with the framework of Govindarajan and Fisher (1990).

4. Penalties for failure at this point assume that investigations have ascertained that low productivity is the result of shirking or incompetence.

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N. Rao Kowtha is a lecturer in the Department of Organizational Behavior at the National University of Singapore. He received a doctoral degree in organization theory from Texas A&M University. His research interests include organizational control, organization design, and cross-cultural implications of organization theory. He is currently studying the emergence of trust in business relations and conducting a study on socialization tactics in organizations.