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**The Role of Country and the  
Effectiveness of Compensation  
Strategies in Technology-  
Intensive Firms**

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# The Role of Country and the Effectiveness of Compensation Strategies in Technology-Intensive Firms<sup>\*</sup>

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## Résumé / Abstract

Le but de cette étude est d'examiner le rôle du pays et de l'intensité technologique dans le choix des politiques de rémunération ainsi que l'influence de ces politiques sur la performance et le taux de roulement du personnel chez les entreprises à forte et faible intensité technologique. En utilisant les résultats d'une enquête réalisée auprès de 602 grandes entreprises dans trois pays différents (Canada, France, Angleterre), nous avons observé que le pays d'implantation de l'entreprise joue un rôle plus important que l'intensité technologique dans la compréhension des choix en matière de rémunération. Une deuxième enquête réalisée auprès de 128 entreprises canadiennes montre que plusieurs stratégies de rémunération sont mieux adaptées au secteur de la haute technologie qu'au secteur traditionnel. En effet, nous avons observé qu'un pourcentage de bonis annuels élevé ainsi qu'une importance accordée aux incitatifs collectifs étaient associés positivement à la performance de marché des entreprises à haute intensité technologique. Les résultats suggèrent également que l'utilisation intensive des programmes d'incitatifs individuels accroît le taux de roulement des entreprises à haute intensité technologique alors que l'utilisation des incitatifs de groupe réduit le taux de roulement.

**Mots clés** : rémunération, haute technologie, culture nationale, performance, taux de roulement.

*The purpose of this study was to examine the role of country and technological intensity in the choice of compensation policies, and the influence of such policies on market performance and turnover in high and low technological intensity firms. Using a survey of 602 large firms in three countries (Canada, France, Great Britain), we show that country plays a more predominant role than technology in understanding compensation policies. A second survey of 128 Canadian organizations shows that several compensation strategies are better adapted to firms in high technology environments. More specifically, we found that greater pay bonuses and emphasis on group performance incentive plans are positively associated with organizational market performance in high tech firms. Results show that extensive use of individual performance pay plans in high tech firms increases the rate of turnover, whereas the use of group incentive plans decreases the rate of turnover.*

**Keywords:** *compensation, high technology, national culture, performance, turnover.*

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Copies of the computer programs used to generate the results presented in the paper, are available from Denis Chênevert.

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A growing body of literature has examined the relationship between human resource policies and practices, and organizational performance (Huselid, 1995; Delany & Huselid, 1996; Arthur, 1994; MacDuffie, 1995). The universalistic perspective states that some human resource practices are always better than others and all organizations should adopt such practices (Pfeffer, 1994). Universalistic predictions were found for HR practices such as staffing (Tersptra & Rozell, 1993; Delany & Huselid, 1996), training (Russell et al., 1985; Bartel, 1994), performance appraisal (Delery & Doty, 1996), information sharing (Kleiner & Bouillon, 1988), job security (Delery & Doty, 1996) and pay for performance plans (Gerhart & Milkovich, 1990; Delery et al., 1996; Delany & Huselid, 1996). Other researchers argued that organizational effectiveness may be improved only when HR polices are consistent with organizational and environmental contingencies (Jackson & Schuler, 1995). The organization's strategy was probably the most contextual aspect studied in relation with HR policies and practices (Huselid, Jackson & Schuler, 1997, Deley & Doty, 1996; Delery et al., 1996; Huselid, 1995). Of HR practices, compensation policies were probably the most studied, along universalistic and contingency perspectives. Although the fit between pay and strategic orientations of business was the principal topic of interest (Balkin & Gomez-Mejia, 1990; Gomez-Mejia & Balkin, 1992; Gomez-Mejia, 1992; Montemayor, 1996; Boyd & Salamin, 2001; Chênevert & Tremblay, 2002), an increasing effort has been directed toward other contingencies, particularly the role of the technological environment and the national culture in the design and effectiveness of pay strategies.

Companies that operate in a context of high technological intensity have characteristics that putatively differentiate them from traditional firms. Several recent

studies have shown that high technology companies tend to develop compensation strategies that are contingent on, or congruent with, their particular context (Balkin and Gomez-Mejia, 1984; Gomez-Mejia, Balkin & Welbourne, 1990; Diaz and Gomez-Mejia, 1997; Milkovich, Gerhart & Hannon, 1991; Shaw, Gupta & Delery, 2001; Chênevert & Tremblay, 2002). Although these studies have provided some interesting results, they are also plagued by a number of limitations. First, apart from the recent work by Diaz and Gomez-Mejia (1997), researchers have evaluated a restricted number of compensation choices. Secondly, past research has measured effectiveness and compensation policies at the same time, introducing a high potential of common variance error. Thirdly, the samples are limited either to very restricted geographical regions (e.g. Boston) or to samples issuing from a single national culture (USA or Spain).

The international perspective suggests that compensation systems must be developed in alignment with national culture attributes, and that a mismatch between compensation strategies and national cultural values may result in a number of dysfunctional consequences (Gomez-Mejia & Welbourne, 1991; Hodgetts & Luthams, 1993). National cultural values congruent with HRM practices and policies increase predictable behaviors and performance (Schuler & Rogovsky, 1998) and optimize the compensation budget (Townsend, Scott & Markham, 1990). Research of Schuler & Rogovsky (1998) provided robust evidence that national culture is an important determinant of variance in compensation practices. However, they did not control the effect of important factors, e.g. industry, size, HR costs and degree of technology intensity. Therefore, it is not clear whether the country has a determinant role in

compensation choices when these other parameters are taken into account. For their part, Townsen et al., (1990) have controlled the industry effect. However, they studied a limited range of pay policies and used an aggregate industries pay data rather than a set of individual company pay data in each country.

This paper pursues three main objectives: 1) to verify whether compensation policies in technology intensive firms differ from those of traditional firms; 2) to examine whether differences observed in the degree of technological intensity transcend national cultures; 3) to evaluate whether some compensation strategies in a technology-intensive context may enhance market performance and reduce the level of turnover.

#### **Appropriate level of analysis of compensation policies: country or sector**

Several researchers contend that human resources managers have sufficient power or discretion within their national systems or countries to align the compensation policies of the firm with the business strategies (Bloom & Milkovich, 1999). Others argue that globalization of economies is gradually inducing an Anglo-Saxonization of human resources management practices on the international scale (Ferner & Quintallina, 1998). Counter to the undifferentiation thesis, other scholars argue that national institutional factors and culture are two powerful determinants of resource management practices in each country (Brewster et al., 1997) and that these factors constrain the liberty of firms to use several personnel policies.

Whereas relations between industry and compensation policies are well established

at the national (or country) level, international comparisons have received little attention to date. As recently noted by Gooderham et al., (1999), the rational model assumes that organizational practices are universal and transcend national cultures. Moreover, institutional theory takes greater account of the possibilities of significant differences in human resources practices between countries. These international differences can be explained by idiosyncrasies specific to the institutional systems in which the organizations operate. In contrast with the strategic perspective in human resources management, the institutional pressures and/or constraints in a particular country somewhat limit the power or the discretion of human resources managers to adopt well-established compensation policies on the international scale. Factors such as taxation and the political context, human resources legislation, representation modes and negotiation of collective agreements, along with culture and national values, can limit the degree of congruence between compensation policies and the strategic context of the firm (Gooderham et al., 1999). The notion that country can be a better determinant of human resources practices than sector has been advanced by Townson et al. (1990), Brewster et al. (1997), Gooderham et al. (1999), and more recently by Sire and Tremblay (2000). Brewster et al. (1997) found that the nature and the extent of flexibility practices vary between countries, with the national context being the best predictor of the use of flexibility. Gooderham et al. (1999), who studied a sample of firms from Germany, France, Denmark, Norway and Great Britain, concluded that human resources practices were explained substantially better by country than by industrial sector (25% vs. 3%). This research highlighted the predominant role of national institutional factors in the formulation of human resources strategies, and the limited freedom of human resources

managers to align human resources and compensation policies with various organizational contingencies.

Townson et al., (1990) studied the influence of cultural affiliations or clusters (Anglo, Oriental, Latin European, Nordic and Germanic) on three pay measures: wages, additional compensation other than wages and the ratio of additional compensation to wages. They found that cultural affiliation explains a significant amount of the variance for each pay measure. However, they observed that industry generally had no significant effect across the culture clusters. Sire and Tremblay (2000) studied the influence of country and industrial sector on diverse indicators (e.g. direct costs) and compensation policies (e.g. proportion of variable pay, employee benefits) from a EUROSTAT database. The data encompass 14 industrial sectors in five European countries, namely France, United Kingdom, Germany, Spain and Italy. The results shown that compensation practices are significantly influenced more by national culture than by industry. They assert that comparison of compensation policies within the Economic European Community must be based on national culture and country rather than on industry. We therefore propose the following general hypothesis:

**H1: Country is a better determinant of compensation policy than the high technology sector.**

## **Compensation policies and technology-intensive firms**



The strategic and contingent perspectives state that technology intensive companies should use different compensation approaches from traditional organizations. Technology-intensive companies have been found to have several common characteristics that differentiate them from traditional enterprises, namely: 1) a product that is highly advanced technologically; 2) greater priority placed on research and development; 3) frequent innovations; 4) high geographic concentration (e.g. Boston, Nice, Toulouse, Sun Valley); 5) a high mortality rate; 6) a relative high percentage of scientists and engineers in the workforce and 7) an abnormally high turnover rate among technical personnel (Milkovich, Gerhart & Hannon, 1991; Cardi & Dobbins, 1995; Gomez-Mejia, Balkin & Welbourne, 1990, Gomez-Mejia, Balkin & Milkovich, 1990). We hypothesize that to reach their objectives, technology intensive firms must adapt their compensation strategies to their specific environment. In the following section, we will discuss the rationale for why some compensation policies are more appropriate than others in such firms, and several hypotheses will be proposed.

### **Internal equity vs. external equity**

The emphasis on internal or external equity illustrates the extent to which firms establish their compensation based on comparisons with the market, often by means of wage surveys, or based on the relative value of jobs within the organization (Gomez-Mejia & Balkin, 1992; Milkovich and Newman, 1996). The design of a pay structure often requires a detailed analysis of jobs, as well as a job evaluation system. This

traditional approach, described as bureaucratic and rigid (Sire & Tremblay, 1999), should be more appropriate and effective in organizations that operate in stable technological and general environments (Diaz & Gomez-Mejia, 1997). Some authors have argued that a strategy heavily oriented on internal equity slows and constrains the decision-making process and induces multiple bureaucratic structures (Diaz and Gomez-Mejia, 1997). In contrast, technology-intensive organizations must be sufficiently agile and flexible to rapidly respond to several factors, namely personnel shortages, intense competition in recruitment of technical specialists and the major wage fluctuations on the market. In an environment where the competitive advantage is largely related to the quantity and quality of human resources available, a weak reactivity to the external market, in favor of a strong internal equity of pay structure, appears incompatible with the environment of technology-intensive firms. Diaz and Gomez-Mejia (1997) observed that a compensation strategy that emphasizes external equity was more apparent in technology intensive companies. However, contrary to the authors' hypothesis, this strategy is not more effective in these firms. Despite these equivocal results, we therefore postulate the following hypotheses:

**H2a: Technology-intensive firms place more emphasis on the market than on internal equity, compared with traditional firms.**

**H2b: A market-oriented compensation strategy will be more effective for technology-intensive firms than for traditional firms.**

## **Pay policy position in relation to the market**

Positioning a pay policy in relation to the market is considered a strategic compensation decision (Gomez-Mejia & Welbourne, 1988). Companies may decide to lead, match or lag behind the market. For technology-intensive firms, the capacity to attract and retain the most qualified technical personnel and innovators is a crucial issue (Milkovich et al., 1991). As the employee pool represents an important asset in such firms, the companies may have a greater incentive to provide rewards equivalent to or higher than the rewards provided in the general labor market (Snell & Dean, 1992). In addition, technology-intensive firms are particularly vulnerable to headhunters that operate in specialized labor market niches. According to efficiency wage theory (Fossum and McCall, 1997), a lead pay policy improves the recruitment capacity and reduces the voluntary turnover rate. Empirical studies provided some support for the market pay strategy of technology intensive firms. Balkin & Gomez-Mejia (1984) have observed that high tech firms are more inclined than traditional companies to pay their technical employees wages above market levels. Milkovich et al. (1991) found that technology intensive firms were more inclined to offer a higher base pay to their managers, relative to the market, than low R&D organizations. Moreover, the high volatility of the products and labor markets in advanced R&D firms require these firms to make frequent pay adjustments owing to the scarcity of resources (Balkin & Gomez-Mejia, 1984; Gomez-Mejia et al., 1990). These pay adaptations are often applied to all employees in order to preserve relative pay equity within the organization, and to limit the problems of wage

compression (Appelbaum, 1991; Balkin & Gomez-Mejia, 1984; Gomez-Mejia et al., 1990). These periodic adjustments may result in an improvement of the position of the firms in the pay market. Furthermore, technology-intensive companies are more likely to adopt decentralized structures (Robert & Gargano, 1990) and varied problem-solving mechanisms (Cardi & Dobbins, 1995). These structural features increase the problem of control of behaviors and outcomes, thus creating a need to introduce an incentive (a higher base salary) in order to sustain the motivation of workers to work harder and smarter. In support of this view, Osterman (1994) found that less supervision was required when the employees were paid above the level required to hire similarly qualified individuals. All of the above considerations lead us to formulate the following hypotheses:

**H3a: Technology-intensive companies are more likely to adopt a lead compensation strategy than traditional companies.**

**H3b: A lead compensation strategy would be more efficient for technology-intensive companies.**

## **Variable pay**

Several variable compensation plans are indeed intended to encourage key personnel to consider themselves owners, to reward them for the success of the organization, and to make them loyal to the company over acceptable time periods (Appelbaum, 1991; Balkin & Gomez-Mejia, 1984; Gomez-Mejia et al., 1990). Considering that retention of qualified and efficient technical personnel is an important issue for the success of technology-intensive firms, and given that the high replacement and turnover costs high, we should expect to find significantly more incentive-based compensation programs aimed at building long-term employee loyalty in technology-intensive firms. In addition, as the resources allocated to R & D often yield fruit only several years later, these companies seek means of motivating technical staff to focus their efforts on longer-term horizons and on the commercial applications of their innovations. In an agency theory perspective, Milkovich, Gerhart & Hannon (1991) suggested that R&D-intensive firms are more subject to the owner-manager information asymmetry problems such as the costs of behavioral monitoring and the difficulty in measuring outcomes. A strong emphasis on performance-contingent compensation appears to be a rational and efficient pay choice for these organizations. Of the empirical studies that support this thesis, Balkin & Gomez-Mejia (1984) concluded that there are substantially more long-term incentive-based programs in high tech firms than in traditional companies (e.g. gain-sharing, stock options). Milkovich & al., (1991) found that R&D intensity had a significant effect on the use of short and long risk-sharing plans.

Diaz and Gomez-Mejia (1997) have highlighted a significant relation between emphasis on long-term compensation and level of technological intensity.

The role of these programs in total compensation is another dimension worth considering. How should employees share the risk of uncertain performance? Diaz and Gomez-Mejia (1997) suggest that high technology companies share the risk with their employees considerably more than traditional companies, for three main reasons: 1) they face greater uncertainty of costs; 2) the high failure rate in this sector demands greater flexibility in allocation of resources; 3) organizational culture in these companies is compatible with risk taking. But only Diaz & Gomez-Mejia (1997) have tested the influence of variable pay. The authors have found that a strong emphasis on risk sharing compensation plans is more efficient in the context of high technological intensity. However their measure of success was the efficiency of the compensation system rather than measures of organizational effectiveness. We therefore propose the following hypotheses:

**H4a: Technology-intensive companies offer significantly more risk-based compensation programs than traditional companies do.**

**H4b: Risk-sharing compensation programs are more efficient in technology-intensive companies.**

## **Compensation and individual performance**

Several specialists have proposed that compensation should be linked to individual performance (Heneman, 1992). Merit compensation and individual performance bonuses are surely the best-known practices in individual performance recognition. Yet several scholars and consultants have criticized these programs, and their efficiency is highly contested (Pfeffer, 1998; Sire & Tremblay, 1999). Others have even suggested that programs that reward individual performance are incompatible with new management techniques founded on continuous improvement, teamwork and cooperation (Demming, 1986; Snell & Dean, 1994). These arguments suggest that technology intensive companies should be less inclined to use individual incentive pay plans than traditional companies. However, the challenge to retain the most critical resources, in a market often characterized by shortages, together with the motivation of the most efficient employees, increase the pertinence of rewarding individual performance (Appelbaum, 1991). In addition, as intensive R&D firms recruit highly skilled employees, performance between individuals may vary considerably. In accordance with dependence theory, Tremblay, Balkin and Côté (1997) found that a high disparity between employee skills and performance was significantly related to a higher portion of variable pay policy. Balkin & Gomez-Mejia (1984) for their part found that merit pay was an extremely widespread practice in high technology companies. Regarding the impact of fit between the technology and individual incentives on effectiveness, Shaw, Gupta & Delery (2001) found virtually no support for their hypothesis that advanced manufacturing technology and individual incentive interaction is associated with lower

effectiveness. These contradictory arguments imply that significant differences should not be observed between the two groups of firms with regard to the importance placed on rewarding individual performances and effectiveness of individual performance-based pay policies.

**H5a: Technology-intensive firms do not differ from traditional firms concerning the degree of recognition of individual performance.**

**H5b: Technology-intensive firms that reward individual performance are not more efficient than traditional firms.**

### **Compensation and group performance**

Balkin and Bannister (1993) suggest that in organizations where a large proportion of expenses are allocated to R&D, technical staff compensation should mainly consist of salary and team bonuses. Significant resources assigned to research and development, along with great uncertainty surrounding survival and growth, call for actions to maintain an acceptable level of liquidity and to reduce fixed costs. Group-based performance pay programs thus represent a logical means of controlling human resource costs and aligning the interests of employees with the firm. Some particular characteristics of high technology companies can explain this compensation strategy. An emphasis on innovation, teamwork and projects legitimizes the use of group rewards (e.g.



team bonuses, profit-sharing). Researchers have found that group bonuses are more prevalent in high technology firms (Balkin & Gomez-Mejia, 1984; Diaz and Gomez-Mejia, 1997), and that aggregate compensation programs are more efficient in high technology firms (Diaz & Gomez-Mejia, 1997) or firms that make extensive use of computer-aided technologies (Shaw et al., 2001). We therefore postulate the following hypotheses:

**H6a: Technology intensive companies offer significantly more group compensation programs than traditional firms.**

**H6b: Group compensation programs are more efficient in technology intensive companies.**

### **Management policies**

Competitive pressure and the importance of reactivity require that decisions be made as low as possible in the hierarchy. In this context, compensation decisions must be decentralized considerably in technology intensive companies to grant units and their managers the necessary leeway to react quickly and adequately to internal and external labor market pressures (e.g. increased capacity of recruiting technical staff, retention of key resources that would otherwise go to a competitor). In addition, the managers require high autonomy of action in pay management to take into account several key factors in the evaluation of the performance and contribution of R&D personnel (e.g. scarcity of

resources). The importance of these factors is difficult to weigh in a highly centralized system (Diaz and Gomez-Mejia, 1997). To our knowledge, only Diaz and Gomez-Mejia (1997) have studied the decision making structure in compensation. They found a positive relationship between the degree of technological intensity and the decentralization of pay decisions. However, they observed that a highly discretionary pay strategy was not more efficient in high technology companies. We thus propose the following hypotheses:

**H7a: Compensation decisions are significantly more decentralized in technology intensive firms than in traditional firms.**

**H7b: Decentralization of compensation decisions is more efficient in technology intensive firms.**

The question of transparency in compensation management has received little attention to date. The literature on organizational justice suggests that information and communication regarding pay can have a positive influence on a variety of attitudes and behavior at work (e.g. Tremblay et al., 1998; 2000). However, the hypothesis that high technology companies practice greater transparency and may benefit from higher payoff than traditional companies engenders contradictory arguments. First, the particular labor characteristics of high tech firms (e.g. more educated, younger, more mobile), the centrality of information in this type of industry and the crucial role of commitment and

loyalty of technical staff suggest that these organizations can gain many advantages by exhibiting substantial transparency in compensation. However, the periodic pay adjustments, frequent recruitments and discretion of managers in pay suggest that high technology firms would benefit little from a policy of openness, particularly when the decisions increase pay differences and internal inequities (e.g. signing bonus, red circles, stock options for key contributors). To our knowledge, no research has investigated the role of transparency of pay information in organizational performance in technology intensive firms. We thus propose the following hypotheses:

**H8a: Compensation information is significantly more transparent in technology intensive firms than in traditional firms.**

**H8b: Transparency of compensation information is more efficient in technology intensive firms.**

## **Methodology**

**First survey:** Data related to independent and compensation variables were collected in 1996 by means of a questionnaire distributed by mail to human resources managers of companies in competitive sectors in three countries (Canada, France, United Kingdom). We have ensured that in all cases the respondents are HRM or compensation managers. The study is directed mainly at business units or company divisions and not

head offices (parent corporation). The survey yielded 602 usable questionnaires broken down as follows: Canada 252 (10% of 2500 largest companies); France 233 (9.3% of 2500 largest companies); UK 117 (11.7% of 1000 largest companies).

**Second survey:** Data related to organizational performance were collected by a second survey. A short questionnaire was distributed by mail two years later to the human resources managers of the 252 Canadian organizations that responded to the first survey. This second survey yielded 128 usable questionnaires for a response rate of 51%. For hypotheses related to performance, only Canadian data are available.

### **Measurement of variables**

**Compensation strategy:** Human resources managers were encouraged to express their opinions of compensation strategies. Some of the measures used have been validated in previous studies (Diaz and Gomez-Mejia, 1997; Balkin and Gomez-Mejia, 1990). Severe collinearity problems among individual compensation policies preclude the use of factorial analysis. This approach assumes that compensation policies and practices may represent more than one dimension of compensation strategy, and pose fewer reliability problems than the use of arbitrary multiple dimensions (Becker & Huselid, 1998). In total, five dimensions were identified by factorial analysis and all items were measured on a five-point Likert scale ranging from “Disagree completely” to “Agree completely.” In addition to these perceptual measures, we have added two objective pay variables, the size of average bonus and the mean relative salary. Factorial analysis

showed that the internal consistent indices are very acceptable. The following dimensions of compensation were evaluated:

- Internal vs. external equity (two indices:  $\alpha = 0.90$ )
- Individual performance (seventh indices:  $\alpha = 0.77$ )
- Group performance (six indices:  $\alpha = 0.79$ )
- Decentralization of pay decisions (two indices:  $\alpha = 0.77$ )
- Transparency of information (six indices:  $\alpha = 0.73$ )
- Percentage of average individual and group bonus (recode on a five-point scale: 1 = 0%; 2 = 1% to 4%; 3 = 4.1% to 8%; 4 = 8.1% to 12% and 5 = more than 12%)
- Mean relative salary (Organizational mean salary divided by Sample mean salary).

**High Technology:** In general, high technology companies are differentiated from other companies by two dimensions. The first pertains to the extent of resources allocated to research and development of new products, defined in this study by the ratio of research and development expenses to total sales or expenses. The second dimension is the proportion of technical, scientific and engineering employees within the total staff. We have thus created a construct based on these two indices ( $\alpha = 0.62$ ).

**Country of origin:** Three dichotomous variables have been used to represent the country (Canada = 1, other = 0; France = 1, other = 0; United Kingdom = 1, other = 0).

**Control variables:** Four variables have been used in this study in order to control the effects of some organizational characteristics. The choice of these control variables is

dictated by previous studies that dealt with similar problems (Arthur, 1994; Gomez-Mejia, 1992; Balkin and Gomez-Mejia, 1990). Labor costs and the gross rate of sales have been measured by a percentage, industry by a dichotomous variable (Service = 1; Manufacturing = 0) and company size by the logarithm of the number of employees.

**Organizational performance:** The organizational performance has been measured by four questions ( $\alpha = 0.82$ ). This measure seeks to evaluate the perception of respondents regarding the performance of their firm relative to the market competitors. Previous studies confirmed the psychometric qualities of this construct (Delany and Huselid, 1996). The scale used includes five conditions ranging from “Very Inferior” (1) to “Very Superior” (5). Because of the cross-industry nature of our sample, standardized measures of performance were not readily available (Youndt et al., 1996). Although perceptual measures of performance may introduce some limitations, previous studies have used such measures and found moderate to strong correlations between perceptual and objective measures of organizational performance (Powell, 1992).

**Turnover:** The turnover has been evaluated by the percentage of voluntary turnover rate in the organization.

### **Data analysis method**

To evaluate the influence of technological intensity and the national origin of firms on compensation strategies, we used a regression analysis with enter procedure. For each

of the dimensions of compensation, we have introduced first the control variables, then the technological intensity variable, followed by the country of origin. This method enables us to measure the distinctive influence of technological intensity and national culture. Moreover, to evaluate the influence of various compensation policies on the market performance and turnover, we have split the sample in two groups, low (under the median) and high (over the median) technological intensity firms. A regression analysis with enter procedure was used for each group. This procedure is useful to verify the presence of a moderator variable (Jaccard et al., 1990).

Table 1 shows the means, standard deviations and correlation coefficients for all the variables examined. To assess the significance of multicollinearity, two statistical tests were performed. First, tolerance is a statistic used to determine the extent to which the independent variables are linearly related to one another. Specifically, it represents the proportion of a variable's variance not accounted for by other independent variables in the equation (Neter, Kutner, Nachtsheim, & Wasserman, 1996). The higher the correlation of one variable with the other independent variables, the closer the tolerance index is to 0. In the present study the tolerance indexes ranged from 0.66 to 0.99, which is highly satisfactory (Neter et al., 1996). Another widely used formal method for detecting the presence of multicollinearity is variance inflation factors (VIF). VIF measure the degree of inflation of the variances of the estimated regression coefficients compared with when the independent variables are not linearly related (Neter et al., 1996). In the present study, the VIF values ranged between 1.01 and 1.66, which is highly satisfactory since a maximum VIF value in excess of 10 is often taken as an indication that

multicollinearity may be unduly influencing the least square estimates. In short, the two statistical tests (tolerance and VIF) indicate that multicollinearity is not problematic in the present study.

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**Insert Table 1 here**

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## **Results**

Table 2 presents the results related to the determinants of compensation policies. Hypothesis 1, which posited that country is a better determinant of compensation policies, is confirmed by our results. For six of the seven compensation policies, the country variable has a higher explanatory power than the technological intensity variable. For example, the technology variable explains less than 1% of the variance regarding the transparency policy, whereas the country variable explains 8%. For the seventh compensation policy studied, the contribution of country variable is significant, even after the effect of labor costs, size, growth and industry is controlled. The results suggest that the level of technological intensity plays a marginal role in the choice of compensation policies when the country is taken into account. Regarding the influence of countries, one interesting finding is the similar pattern of compensation policies of the UK and Canada compared with France. UK and Canadian firms are more likely to promote group based performance pay and external equity, and are less likely to encourage the



individual performance and transparency of pay and to offer bonuses for rewarding performance than France organizations.

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**Insert Table 2 here**

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Hypothesis 2a, which states that technology intensive companies emphasize external rather than internal equity, is not supported ( $\beta = .00$ , n.s). Hypothesis 3a is confirmed by our results. Technology intensive firms seem to pay better than the market ( $\beta = .33$ ;  $\Delta R^2 = .106$ ,  $p \leq .01$ ). Hypothesis 4a is also supported. The intensity of technology is positively related to the size of performance bonus ( $\beta = .11$ ;  $\Delta R^2 = .012$ ,  $p \leq .05$ ). Hypothesis 5a was not affirmed. The results show that technology intensive firms tend to use individual performance plans more extensively ( $\beta = .15$ ;  $\Delta R^2 = .021$ ,  $p \leq .01$ ). We postulated that this compensation policy would not be associated with the level of technological intensity. Hypotheses 6a, 7a and 8a are not confirmed. There are neither more group compensation programs nor greater decentralization and transparency of pay decisions in technology intensives firms.

Table 3 presents the results of the influence of individual compensation policies on market performance and turnover for low and high technology intensity firms. Hypothesis 2b is not supported. A compensation policy centered on the external market does not appear more efficient in technology intensive companies. Hypothesis 3b received no support. Results show that positioning pay above the market does not

enhance the perception of the market performance in high technology intensity firms. However, this policy has a significant negative influence on turnover, but only in low high tech organizations ( $\beta = -.38, p \leq .01$ ). Contrary to our hypothesis, the reduction of turnover by an aggressive pay policy relative to the market seems more efficient in traditional than in technological intensive firms.

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**Insert table 3 here**

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Hypothesis 4b is strongly supported for the market performance measure. The results show that the size of annual bonus is significantly and positively related to market performance in the high tech intensity firms ( $\beta = .40, p < .01$ ). Moreover, our results only partially support Hypothesis 5b. We predicted that technology intensive companies that reward individual performance were not more efficient than others. The results have been verified only for the market performance measure (High:  $\beta = -.20, n.s.$ ; Low:  $\beta = -.04, n.s.$ ). Regarding the turnover rate, interesting findings were found. Whereas the use of individual performance pay plans seems to enhance the workforce stability in low tech firms ( $\beta = -.23, p < .10$ ), this same pay policy is associated with a higher level of turnover in high tech organizations ( $\beta = .37, p \leq .01$ ).

Hypothesis 6b is fully confirmed. Extensive use of group performance pay plans in high intensive technology firms is significantly and positively related to market performance ( $\beta = .31, p < .05$ ), and negatively related to turnover ( $\beta = -.33, p \leq .05$ ).

The findings show that extensive use of group rewards appears to increase the rate of turnover in traditional firms ( $\beta=.23$ ,  $p<=.10$ ). Concerning Hypothesis 7b, the results reveal that the decentralization of pay decision-making is not more efficient in high tech than in low technological intensive firms. Finally, practicing a pay openness policy does not seem to be associated with greater efficiency in technology intensive companies. This result refutes Hypothesis 8b. In fact, the findings reveals that a pay openness policy has a rather less negative effect on market performance in high tech than in low technological intensity firms. (High:  $\beta=-.09$ , n.s; Low:  $\beta=-.32$ ,  $p<.05$ ). Although the results are not significant for the turnover model, the same pattern was observed.

## **DISCUSSION**

This present study suggests that the degree of technological intensity plays a marginal role in compensation choices in an international context. The country is ultimately the best determinant of compensation strategies. Our findings corroborate recent international research by Sire & Tremblay (2000), Gooderham et al. (1999) and Brewster et al. (1997). The rational perspective, whereby firms have sufficient decision-making autonomy to align their human resources policies on internal contingency aspects such as business strategies or technology intensity, must be reexamined when the level of analysis of compensation policies is shifted to the international scale. Although the main objective of this paper was to investigate the role of country in compensation policies rather than explain individual differences between countries, some intriguing findings could be noted.

We found some mismatch between the cultural dimensions of Hofstede (1980) and the compensation policies of Canadian, UK and French firms. Recent international compensation studies also identified some inconsistencies between national cultural values and compensation policies (Lowe et al., 2002). Despite a high power distance index, French firms tend to promote greater decentralization and openness of pay than UK businesses. Despite a high score on the cultural dimension uncertainty avoidance, French firms seem to be favor risk compensation plans more than their Canadian and UK counterparts. In addition, whereas France has a lower index on the individualism dimension than Canada and UK, we found that individual performance pay was more prevalent in French firms. Lowe et al. (2002) observed that individualistic countries such as the US and Canada had a low mean score on individual pay incentive policy. It has been suggested that national culture influences HR practices in conjunction with other contextual factors (Milliman et al., 1998). Institutional factors, such as fiscal and tax policies, human resources and collective bargaining laws and structures of representation, may represent better determinants of compensations policies than the cultural dimensions per se. For example, France firms are obliged by law to implement share compensation plans (e.g. gainsharing and/or profit-sharing), to produce and disseminate a “bilan social” each year, to negotiate wages at the industry or branch level and to consult the “comité d’entreprise” on several human resource decisions, whereas UK and Canadian firms have no such legal obligations. Thus, the national institutional regimes in which firms operate appear to be an indispensable framework to understand and explain why compensation policies differ across countries.

Nonetheless, technological intensity remains a useful variable to explain the compensation choices. Our results corroborate some of those of Milkovich et al., (1991) and Diaz and Gomez-Mejia (1997). Technology intensive firms implement specific compensation strategies that differ from those of traditional firms. Some of the results deserve further comment. In corroboration with Balkin and Gomez-Mejia (1984), we found that employees in technology intensive firms are more likely to be paid on their individual performance than those in low R&D organizations. Counter to the findings of some scholars, technology intensive firms do not seem to consider individual performance pay plans as incompatible with a culture of innovation and teamwork. Perhaps conservation of the most critical resources and motivation of the most efficient employees are prevalent objectives in a technological field, and that the risk of not rewarding individual contributions is probably perceived as too high by the decision-makers in such firms. However, the most fundamental distinction observed is the scope of recognition of individual performance. In accordance with findings of Milkovich et al. (1991) and of Diaz and Gomez-Mejia (1997), we found that high technology firms were more likely to use larger bonuses to reward employee performance. Yet the results relative to the efficiency of individual pay for performance plans deserve comment. We found that this pay choice has a neutral influence on perceived market performance in high and low intensity technology firms. In contrast, we observed that individual performance pay plans increase the rate of turnover in technology intensives firms, but enhance the stability of workforce in low technological firms. There seems to be an important mismatch between the use of the individual performance compensation policy

and its efficiency in high technology intensive firms. Do high tech firms not derive some benefits from this pay policy?

A strong emphasis on individual performance and rewards has potential drawbacks, such as decreases of intrinsic motivation, cooperation, satisfaction and equity (Heneman, 1992; Shaw et al., 2001). In accordance with the justice literature, the perception of individual inequity is positively associated with the desire to quit (School et al., 1987; Tremblay & Roussel, 2001). In addition, turnover studies found that the decision to quit is easier when the job market is favorable (Mobley et al., 1979). When the demand for highly skilled and specialized employees in intensive technological sectors is high, it is easier for those dissatisfied with individual compensation plans to accept an offer from another employer. Further research should explore more extensively why employees in intensive technology firms react more negatively than those in traditional firms to individual performance pay plans.

Contrary to Diaz and Gomez-Mejia (1997), we found no significant relationship between the degree of technological intensity and the use of group compensation policies. However, the use of the group in performance pay plans in high technology intensity firms was positively associated with market performance, and negatively related to turnover. Supplemental analysis reveal that an increase of the importance of group performance incentive of one-unit, decrease the rate of turnover by 2.1%. In accordance with the findings of Diaz & Gomez-Mejia (1997), group incentive plans seem to improve the organizational performance and employee retention. However, these positive results

occur only in high tech intensity firms. In low technological firms, in contrast, an emphasis on group rewards is associated with higher turnover. A recent study found that use of group incentive plans was associated with a higher rate of turnover (Guthrie, 2000). Why does agency theory appear to be a powerful mechanism to explain the greater efficiency of group incentive plans in high intensive technology firms, but not in traditional firms? We propose some tentative explanations. It is possible that the free-rider effect is greater in low tech. than in high tech. firms. As the high tech. firms are generally smaller than traditional firms, the use of group incentive plans may contribute to a greater incentive alignment and mutual monitoring in the former firms. This lesser performance dispersion increases the feeling of equity, and encourages the improvement of performance and the desire to remain in the organization. We can also speculate that risk and workgroup are perceived as more legitimate values by employees in high technology intensive firms than those of traditional firms. This greater congruence or fit between the organizational culture and employee values may explain why the use of group incentives plans is more successful in high tech. firms. More extensive research is needed in the future to clarify why the use of group incentive plans may have adverse effects in contexts of low technological intensity and a positive influence when they are used in an environment of high technological intensity.

Our results support past studies that have found that high technology intensive companies pay above market, but this pay policy does not appear to be more efficient in such firms. However, like Guthrie (2000), we found that traditional firms have a significantly lower level of turnover when they adopt a pay policy above the market. The

weak influence of market pay policy on organizational performance and turnover in high intensive technology firms may be explained by the measurement used. In this study, the market pay policy was evaluated by the mean relative salary for all non-management employees in an organization. However, as some scholars have pointed out, within a single organization, there may be several different pay policies in relation to the market (Milkovich and Newman, 1996). Perhaps technology intensive companies are more inclined than other firms to segment their market policies within the organization. If so, this would partly explain the fact that differences were not observed. Moreover, our study did not identify specific markets used to establish pay policies. Future research should explore more extensively the role of external pay comparisons in a technological intensive environment.

Lastly, this study shows that high transparency did not emerge as a discriminating policy. However, one intriguing finding is that greater pay openness is significantly related to lower market performance in low intensive technology firms. Why should sharing compensation information have a negative influence on organizational performance? There are several possible explanations. Some employers are more likely to believe that a secrecy policy may reduce potential conflicts between employees and supervisors, especially when pay increases or bonuses are based on an individual performance appraisal (Milkovich and Anderson, 1972). In addition, private compensation information may give managers greater discretion in allocation of rewards, and especially the freedom to recognize the most valuable employees and contributors. Furthermore, this greater discretion reduces the pressure on managers to justify each of



their compensation decisions. Accordingly, the firms may choose not to disclose pay information, and particularly when employees are unionized, in order to preserve the feelings of internal equity that may otherwise jeopardize the work climate, productivity and the control of workforce costs. The absence of an observable relationship between pay openness and organizational performance in high intensive technology firms is more difficult to explain. We can speculate that, in such firms, disclosure of pay information has a less detrimental effect on labor or product costs than for traditional firms. As the former firms are generally less unionized, the power of such information is individual rather than collective. Thus, as the residual costs associated with the access to greater pay information are negligible, and their effect on the capacity of firms to compete on their product or service market is limited. Future research should explore more extensively why pay information may have detrimental consequences in some cases, and not in others.

## Conclusion

Although we have found very limited evidence that compensation choices are driven by the intensity of technology and that this internal organizational contingency remains a useful parameter to take into account in order to increase the efficiency of compensation policies, the present study has also shown that the national dimension is significant and the country plays a more predominant role than the technology dimension in compensation choices. Nonetheless, some limitations should be noted. First, we cannot rule out the possibility of response bias. We measured the performance of Canadian

organizations exclusively. The link between compensation policies and firm performance could be different for those countries, as recent studies have suggested (Lowe, Milliman, De Cieri & Dowling, 2002). Second, the HR directors' and compensation managers' answers were not compared with other viewpoints, for example those of line managers or employees. In addition, some compensation strategies could not be measured (e.g. job or skills, direct vs. indirect compensation). There is also a possibility of omitted variables bias. For example, organizations that adopt some compensation policies may have higher quality workers (Ichniowski et al., 1996) or have adopted other forms of rewards such as fringe benefits and non-monetary recognition practices. Although predictors and performance were measured on two occasions, our study design is not immune from causality problems. It is possible that the most efficient organizations have introduced more progressive compensation programs in order to sustain the motivation of their workforce. In addition, we used self-report performance measure rather than objective indicators. Future research should use more objective measures of efficiency such as quality, customer satisfaction and productivity. In addition, the literature on strategic human resource management suggest that human resource practices such as compensation may lead to positive outcomes when combined with appropriate complementary practices, and to worse outcomes when implemented in isolation (Becker et al., 1997; Gerhart, 2000). It would be useful, in an international perspective, to evaluate the effect of some combinations of compensation policy architectures. In the same vein, it would be useful to examine whether certain HR policies play a substitute role in the choice of compensation policies. We cannot rule out that in some countries high tech. firms are more likely to offer a generous fringe benefits package, greater job

security and better career opportunities instead of a high base salary and an aggressive individual performance plans.

In conclusion, the goals of this current study was to add to existing evidence that national dimension plays a predominant role in designing a compensation strategy, and that the level of a firm's technology intensity must be taken into account in a quest for greater efficiency of the compensation policies. Practitioners must acknowledge that specific compensation policies play a positive role when technology intensity increases, whereas other pay policies may have a detrimental influence in the same context. The universalistic perspective is not always a source of efficiency; practitioners must pay greater attention to internal and external contingencies when formulating compensation policies.

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**Table 1:** Table of correlations

Variables	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Labor Cost	39.45	20.76	1														
2 Size	2531	11144	-.07	1													
3 Growth	39.45	20.76	-.01	-.07	1												
4 Service industry	.406	.491	.43**	-.04	-.04	1											
5 High Tech.	8.12	12.42	.08	.01	.06	-.01	1										
6 UK	.19	.39	-.09	.25**	.04	-.06	-.02	1									
7 Canada	.42	.49	.03	-.44**	.08	.15**	-.09*	-.42**	1								
8 France	.39	.49	.05	.25**	-.11*	-.10*	.11*	-.39**	-.67**	1							
9 External Equity	3.61	.97	.07	-.09	-.02	-.03	-.04	-.27**	.00	.21**	1						
10 Mean rel. salary	1.00	0.35	.02	.29**	-.01	.02	.28**	.25**	-.32**	.12**	-.14**	1					
11 Annual Bonus	2.77	1.49	-.08	.24**	-.04	.03	.08	.03	-.27**	.25**	.03	.13**	1				
12 Individual perf.	3.15	.79	-.02	.19**	-.03	-.02	.15**	.11*	-.34**	.25**	.05	.24**	.24**	1			
13 Collective perf.	2.69	.98	-.15**	.03	.10**	-.09	-.02	.10*	.08	-.16**	-.05	-.03	.11*	.00	1		
14 Decentralization	2.07	1.23	-.07	.07	.01	-.20**	.04	-.08	-.12**	.19**	-.04	.08*	.05	.00	.00	1	
15 Transparency	3.35	.90	.05	.03	-.03	.02	-.02	-.25**	-.06	.27**	.10**	-.03	.01	.00	.00	.00	1

\*\* : = p<=0.05

\*\*\* : = p<=0.01

**Table2:** Influence of Technological Intensity and Country of Origin on Compensation Strategies (N=544)

	External Equity		Mean relative salary		Bonus level		Individual Performance		Group Performance		Decentralization		Transparency	
	Beta	$\Delta R^2$	Beta	$\Delta R^2$	Beta	$\Delta R^2$	Beta	$\Delta R^2$	Beta	$\Delta R^2$	Beta	$\Delta R^2$	Beta	$\Delta R^2$
<b>Control Variables</b>														
HR cost	.05		.04		-.09*		-.01		-.15***		.00		.00	
Size	-.08		.32***		.22***		.19***		.07		.17***		-.01	
Growth	-.02		.01		-.05		-.03		.11**		-.04		-.03	
Industry	-.05		.00		.04		.01		.00		-.17***		.02	
		<b>.009</b>		<b>.104***</b>		<b>.061**</b>		<b>.036***</b>		<b>.039**</b>		<b>.066***</b>		<b>.001</b>
<b>Determinants</b>														
Tech. Intensity	.00		.33***		.11**		.15***		.00		-.04		-.10*	
		<b>.000</b>		<b>.106***</b>		<b>.012**</b>		<b>.021***</b>		<b>.000</b>		<b>.002</b>		<b>.009*</b>
UK <sup>1</sup>	.30***		.16***		-.13**		-.09*		.20***		-.11*		-.33***	
Canada	.15***		-.14**		-.27***		-.35***		.23***		.16**		-.20***	
		<b>.067***</b>		<b>.056***</b>		<b>.044***</b>		<b>.089***</b>		<b>.046***</b>		<b>.041***</b>		<b>.158***</b>
<b>Full model</b>		<b>.076***</b>		<b>.266***</b>		<b>.118***</b>		<b>.146***</b>		<b>.085***</b>		<b>.109***</b>		<b>.169***</b>

\*: = p<=0.10  
 \*\*: = p<=0.05  
 \*\*\*: = p<=0.01

<sup>1</sup> France is the omitted variable

**Table 3:** Influence of Compensation Strategies and Technological Intensity on Canadian Organizations Performance (N=128)

	Organizational performance (Market)						HRM performance (Turn Over)					
	Full Model		Low Tech. intensity		High Tech. intensity		Full Model		Low Tech. intensity		High Tech. intensity	
	Beta	$\Delta R^2$	Beta	$\Delta R^2$	Beta	$\Delta R^2$	Beta	$\Delta R^2$	Beta	$\Delta R^2$	Beta	$\Delta R^2$
<b>Control Variables</b>												
HR cost	.12		.07		.11		-.13		-.19		.12	
Size	-.17*		-.02		-.35**		-.07		-.16		-.09	
Growth	.23**		.39***		-.18		-.05		-.08		.03	
Sectors	-.15		-.17		-.03		.19*		.27**		-.12	
$\Delta R^2$		.101*		.187**		.114		.045		.089		.032
<b>Technology intensity</b>												
	-.03						.14					
$\Delta R^2$		.000					.000					
<b>Compensation Strategies</b>												
External Equity	.06		.07		.15		.04		.08		-.09	
Mean relative salary	-.01		.05		-.13		-.43***		-.38***		-.22	
Annual Bonus	.23**		.05		.40***		.02		.14		.16	
Individual Performance	-.11		-.04		-.20		-.03		-.23*		.37***	
Group Performance	.04		-.17		.31**		.07		.23*		-.33**	
Decentralization	-.03		.00		.09		-.12		-.11		-.06	
Transparence	-.21**		-.32*		-.09		.05		.15		-.09	
$\Delta R^2$		.095		.114		.331*		.192***		.316***		.312**
<b>Full Model</b>		.196*		.301		.445*		.238***		.405***		.343*

\* p<=0.10

\*\* p<=0.05

\*\*\* p<=0.01