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Ph.D. Business Administration and Management - XVII° Cycle

Dissertation

Performance measurement:

evaluation, incentives, and compensation

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The object is an object. It can and does exist outside the mind, or in the absence of the mind. And therefore, it enlarges the mind of which it becomes a part. The mind conquers a new province like an emperor; but only because the mind has answered the bell like a servant. The mind has opened the doors and windows, because it is the natural activity of what is inside the house to find out what is outside the house.

(G. K. Chesterton)

TO A GREAT FRIEND

Who made the infinite familiar

in the most common conversations

CONTENTS

PREFACE

RESEARCH PURPOSE

The past fifteen years have seen the diffusion of new performance measurement techniques within the organizations. Sophisticated financial indicators (e.g., Economic Value Added), combinations of non-financial perspectives in addition to the traditional financial measurement perspective (e.g., Balanced Scorecard), and integrated models to implement and evaluate business strategies (e.g., business model) are some examples of the new way to approach performance measurement (Steward, 1991; Kaplan and Norton, 1996; Kaplan and Norton, 2001). Moreover, advance information systems solutions (e.g., Enterprise Resource Planning) changed the process to measure, report, and represent performance results (e.g. Scapens et al., 1998). These phenomena have attracted the attention of both managers and management accounting scholars. However, recent academic reviews indicate that many limitations affect the research on performance measurement and several interesting research questions are still open (Merchant et al., 2003; Bonner and Sprinkle, 2002; Bonner et al., 2000; Ittner and Larcker; 1998).

The purpose of my dissertation is to analyze the effects of performance measurement within the organizations, trying to overcome the limitations affecting prior literature. I conceive performance measurement as a managerial mechanism influencing the organizational context. In particular, my study focuses on three aspects of performance measurement: evaluation, incentives, and compensation. Based on performance *evaluation*, organizations monitor and control financial and non-financial results to implement their strategy. Based on performance-

based *incentives*, organizations influence individual behaviors to achieve higher performances. Based on *compensation*, organizations attract, retain, and reward individuals to align organizational and individual interests. Specifically, my study investigates the effect of evaluation, incentives, and compensation on strategic alignment, individual performance, and external control systems, respectively.

My dissertation consists of three papers referring to separate research projects. The first paper (Compensation Paper) presents the results of a survey on the control systems used by Italian listed companies. In particular, I examined the relationship between CEO compensation and independent directors and voluntary disclosure. The second paper (Evaluation Paper) discusses the use of performance measurement systems to influence decision making. In particular, I investigated antecedents and consequences of the influence of performance measurement systems on strategic decisions within subsidiaries of multinational companies. The third paper (Incentive Paper) presents a study on the behavioral responses to incentive characteristics and their links with performance. In particular, I tested hypotheses on the effect of mediating and moderating variables within the relationship between incentives and individual performance.

The next section briefly synthesizes theories, empirical settings, data collection techniques, and data analyses used in the three research studies.

RESEARCH METHODOLOGY

My approach to performance measurement is rooted in management accounting and control systems literature. Based on Simons (2000), I define performance measurement as the "formal, information-based routines and procedure managers use to maintain or alter patterns in organizational activities" (Simons, 2000, p.4). This definition emphasizes the use of performance measurement to influence the organizational context. To study the effects of

performance measurement and, specifically, of performance evaluation, incentives, and compensation I referred to different theories from different disciplines. Specifically, the Compensation Paper deals with the control problem theorized by the agency theory (Jensen and Meckling, 1977). The Evaluation Paper combines insights from organizational theories on multinational companies (Nohria and Ghoshal, 1997) and contingency theory on management control systems (Chenhall, 2003). The Incentive Paper takes arguments from the psychology-rooted role theory (Kahn et al., 1964), the cybernetics-rooted feedback-seeking behavior theory (Ashford and Cummings, 1983), and the stewardship theory (Davis et al., 1997). The three papers describe the specific theoretical frameworks developed to address the research questions.

The papers have different unit of analysis, consistent with the issues under investigation. The Compensation Paper is based on data referring to non-financial listed companies. The analysis presented in the Evaluation Paper considers Italian subsidiaries of foreign multinational companies. Employees of Nokia Italy represent the unit of analysis for the study discussed in the Incentive Paper.

To test my hypotheses in the empirical settings, I adopted multiple research methods. I collected data though publicly-available data sources (for Compensation Paper), questionnaire-based surveys (for Evaluation Paper and Incentive Paper), and private datasets (for Incentive Paper). In addition, the three studies rely on qualitative information collected through a focus group (for Evaluation Paper) and field works (for Incentive Paper) in order to enrich the quantitative analyses. Results are based on multivariate statistical analyses, namely regression (for Compensation Paper and Evaluation Paper) and structural equation models (for Incentive Paper).

The next section provides a short summary of each of the three papers.

RESEARCH SUMMARY

Compensation Paper

Recent accounting scandals and recently-issued regulations have oriented much attention on control systems in both academic journals and popular press. Italy is one of the countries particularly affected by accounting scandals. Moreover, Italian financial authorities have recently issued regulations to influence the corporate governance mechanisms of Italian listed companies. I conducted a survey on three control systems (i.e., independent directors, CEO compensation, and voluntary disclosure) used by non-financial companies listed on Milan Stock Exchange. My study reports hand-collected data on the presence of independent directors on boards, the CEO compensation packages, and the level of voluntary information disclosed in companies' annual reports (measured by a D-SCORE adapted from the one used by Botosan, 1997). I investigated the relationship between the two internal control systems (i.e., independent directors and CEO compensation) and the external control system (i.e., voluntary disclosure). Prior studies obtained conflicting results on this relationship, especially within setting characterized by high ownership concentration. Consistent with an agency theory framework, I found that independent directors is positively correlated with the level of voluntary disclosure while checking for the effects of other determinants of disclosure, such as firm size, leverage, residual ownership diffusion, and profitability. I do not find statistical significance for the relationship between compensation and voluntary disclosure. My study is one of the few researchers studying Italian financial market. Statistics on the control systems used by Italian companies contribute to know an important market characterized by high ownership concentration. My analysis reveals the positive interaction between independent directors and voluntary disclosure. Finally, CEO compensation data suggest low reliance on incentives systems by Italian companies.

Evaluation Paper

In headquarters-subsidiary relationships, performance measurement systems (PMSs) play a key role in coordinating and controlling local activities. PMSs are employed to monitor performance and to influence decision-making. My empirical research focuses on the decision-influencing use of performance measures in a multinational setting that is the influence PMSs have on subsidiary's decision making. Advocates of multidimensional approaches to PMS argue that balanced PMSs facilitate goal congruence and strategic alignment throughout the organization. The underlying assumption is that balanced PMSs lead manager to better understand the relation among various strategic objectives, to communicate the association between employees' actions and strategic goals, and to allocate resources and set priorities based on those objectives. My study examines the decision-influencing use of PMSs through survey data and a focus group. First, I investigated the link between balanced PMSs and decision-making by examining survey data collected through questionnaires mailed to 100 Italian subsidiaries of foreign multinational groups. The quantitative survey data (based on a response's rate of 70%) reveal that the influence of headquarters-initiated PMSs on local decisions is low and alternative systems guide subsidiary's decision-making. Further, my analysis shows that measurement diversity *per se* does not increase the influence of PMSs on strategic decisions. Finally, I found that local managers tend to develop independent PMSs different from those implemented by headquarters, in order to better manage and support subsidiary's activity. Second, I discuss the empirical evidence providing qualitative arguments derived from a focus group with nine respondents to the questionnaire. Participants analyzed the survey results and discussed the role of balanced PMSs in generating strategic alignment. The focus group suggested that PMS-design style, global competitive pressure, and subsidiary entrepreneurship are three relevant aspects for the effectiveness of balanced PMSs within multinational organizations.

Overall, my findings based on quantitative and qualitative data contribute to the literature on balanced PMSs through the analysis of the decision-influencing use of performance measures, and suggest practical implications for an effective implementation of balanced PMS in multinational contexts.

Incentive Paper

My study helps to understand the link between incentives and individual performance. Most of the accounting research on this topic applies economics-based theories, especially agency theory. Moreover, prior study obtained conflicting results because they fail to consider relevant intervening variables. I investigated individual behavior-related mediating variables intervening in the incentive-performance relationship. In particular, my focus was on the effect of incentive systems characteristics (measurement diversity and subjectivity) on behavioral variables (role conflict, role clarity, and feedback-seeking behavior) in order to explain the variance in individual performance. I referred to psychology-rooted and cybernetics-rooted theories to generate my hypotheses on the effect produced by incentives on individual behavior and performance. Further, I investigated the moderating role played by personal attributes in the incentive-performance relationship. Based on value commitment, I categorized individuals into two different types of models of man (i.e, the agent and the steward) derived from two different management theories. My hypotheses predict that the behavioral responses to incentives are different for the two types of individuals. The research site used is the Italian subsidiary of Nokia. About 460 employees are involved in the short-term incentive plan. I used proprietary data to measure incentive characteristics and conducted an internal survey to capture individual behavior-related variables. I measured individual performance based on perceptual and objectives measures. My analysis shows that measurement diversity leads to a lower individual performance through the role conflict experienced by the subordinate. I do not find support for the mediating effect of feedback-

seeking behavior within the relationship between subjectivity and individual performance. The moderating effect of model of man results to be particularly evident in presence of subjectivity: only stewards-oriented individuals seek feedback in response to subjective valuations. My findings reveal the explanatory power of behavioral variables in understanding the incentive-performance relationship and show the benefits of a multi-disciplinary approach to performance measurement and incentives research.

CONTRIBUTIONS

The combination of the three research studies included in my dissertation offers several contributions.

First, my dissertation is an attempt to overcome the "single-paradigm-induced blinders" limitation that hinders progress in accounting research (Merchant et al., 2003, p. 251). My dissertation refers to several theories derived from different disciplines. The multi-discipline approach of the three studies reveals three specific contributions. In the Compensation Paper the simultaneous analysis of CEO compensation, independent directors, and voluntary disclosure shows that they contribute differently in coping with the control problem. The Evaluation Paper shows the benefits of the cross-fertilization between international business studies and management control systems research. Multinational companies appear to be a fruitful empirical setting to study performance measurement. Lastly, the adoption of two views of the world proposed by alternative theories allows the discovery of moderating variables in the Incentive Paper.

Second, my dissertation is based on a multi-method research approach which enriches empirical findings. The Compensation Paper considers the Italian financial market that is characterized by low level of public data availability. The ad-hoc constructed instrument to measure voluntary disclosure and the descriptive statistics on control systems offers the bases

for future research in this context. In the Evaluation Paper, the qualitative information collected through the focus group allowed to discover the consequence of performance measurement systems. My study is one of the few management accounting studies using focus group as a method of research. Through the different methods used in the study presented by the Incentive Paper, I measured individual performance with both perceptual and objective measures.

Third, my dissertation documents that the adoption of different theories and methods improves the variables measurement processes. The Compensation Paper provides an instrument to measure voluntary disclosure in Italy. The Evaluation Paper proposes an operationalization of the decision-influencing use of performance measurement systems. The Incentive Paper proposes an index for measurement diversity that takes into account both the number of performance measure and the related weights.

Fourth, the three papers report empirical findings which increase our knowledge on performance measurement. The Compensation Paper suggests that incentive systems do not affect external control systems within an empirical setting characterized by high ownership concentration. The Evaluation Paper indicates that the design of performance measurement systems is a crucial aspect for their effectiveness in influencing strategic decisions within multinational companies. The Incentive Paper shows that measurement diversity leads to dysfunctional behavior (i.e., role conflict) that, in turn, negatively affects individual performance.

Finally, the obtained results suggest practical implications. The Compensation Paper underlines the importance for regulators to consider the mix of control systems employed by the companies in improving corporate governance mechanisms. The positive relationship between independent directors and voluntary disclosure indicate that the two control systems are complementary. The Evaluation Paper emphasizes the relevance for the headquarters to

share the performance measurement systems design with local managers in order to increase their influence on the subsidiary's decision making. The results discussed in the Incentive Paper are useful for managers responsible to design performance based rewards.

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Compensation Paper

Survey on control systems in Italian listed companies: independent directors, compensation, and voluntary disclosure

I. INTRODUCTION

This paper provides data on the use of three control systems within Italian listed companies. Control systems are employed by companies to cope with the separation between ownership and management that is the so-called control problem (Fama and Jensen, 1983a). The ownership can control the management through three different categories of mechanisms: (i) monitoring is the mechanism employed by the ownership to obtain information about the behaviors and decisions of management; (ii) incentives are the mechanism employed by the ownership to align divergent goals; (iii) bonding is the mechanism adopted by the management to communicate with the ownership. Based on Williamson (1984) and Shleifer and Vishny (1986, 1997), this study considers monitoring and incentive as internal control systems and bonding as an external control system: the former (e.g., corporate governance structures and compensation packages) supervise and orient managers' behavior; the latter (e.g., annual reports and voluntary disclosure) reports information about managers' action to external stakeholders. The three categories are widely discussed in related streams of research within both Economics and Business literature. We can also find a vast amount of empirical research testing the effectiveness of the control systems in resolving the control problem (e.g., Brickley and James, 1987; Chow and Wong-Boren, 1987; Weisbach, 1988; Kosnik, 1990; Lee et al., 1992; Wallace et al., 1994; Raffournier, 1995; Botosan, 1997; Bushee and Noe, 2000; Erhardt et al., 2003).

In this paper, I provide empirical evidence on the use of monitoring, incentives, and bonding within non-financial companies listed on Milan Stock Exchange in 2002. I consider the Italian stock market as an intriguing empirical setting for several reasons. First, there is a considerable lack of empirical studies on Italian listed companies. This might be due to

economic and social aspects like, for example, the relative small size of the financial market, the low amount of public information, the paternalistic management style, the weakness in investor protection, etc. However, in the international academic literature, this lack of attention on Italian companies has not been clearly and explicitly justified. Exploring the characteristics of Italian firms and of the systems they use can potentially provide the basis for fruitful empirical research in such an economic setting. Second, at the end of the 1990s a wave of new regulations involved the Italian stock exchange, creating a financial environment with mechanisms comparable with those employed in foreign and well-established stock markets. In particular, in 1999 CONSOB issued an important regulation on compensation, according to which listed companies are required to disclose the compensation package of the board of directors in their annual reports (CONSOB, 1999).[1] In the same year, the Italian Stock Exchange issued the code of corporate governance (hereafter CCG) to promote the adoption of investor protection mechanisms (Borsa Italiana, 1999). The document represents an auto-regulation, meaning that the rules are set by listed companies which voluntarily committed themselves to follow them in addition to legal requirements. This paper provides data on chief executive officer (CEO) compensation and independent directors that are two of the most crucial systems affected by the new regulations.[2] Third, the Italian financial market is dominated by companies characterized by a high level of ownership concentration: such a context is assumed to have less severe control problem because the strict linkages between ownership and management (Demsetz and Kenneth, 1985; Morck, 2000). However, empirical research provides conflicting results. This paper reports statistics on the adoption of control systems and explores the predicting power of some economics determinants proposed by prior literature. Further, this study examines

[1] COSNOB is the Italian Stock Exchange Commission, which is the authority supervising the Milan Stock Exchange.

[2] In this paper, the term CEO refers to the position of Amministratore Delegato within Italian companies.

different control systems, offering an attempt to organically analyze the spectrum of mechanisms used to solve the control problem. The review conducted by Chenhall (2003) on published accounting papers studying management control systems reveals that scholars tend to study these systems as mechanistic mechanisms, meaning that most of the studies examine one control system, separated from the others. This leads to limited and, sometimes, misleading results because of inconsistent theoretical frameworks and relevant omitted variables. Chenhall's review calls for research conceiving control systems as organic interacting mechanisms (Chenhall, 2003). This paper analyzes one external and two internal control systems and provides preliminary results on their interaction.

Empirical data refer to the non-financial companies listed on Milan Stock Exchange in year 2002. This study focuses on independent directors as monitoring system, compensation as incentives, and voluntary disclosure as bonding system. Independent directors are those reported by the companies according to the definition and the requirements stated in the CCG. Annual reports are the data source for CEO compensation package, namely emoluments, non-monetary incentives, variable bonuses, and other incentives. The level of voluntary disclosure is assessed based on the Botosan's instrument (Botosan, 1997) with some adjustments to take into account the peculiarities of Italian context. All data are hand-collected using multiple sources. Results show that Italian listed companies, on average, have 36% of independent directors in the board, disclose low level of voluntary information and concentrate it on management discussion and analysis, and compensate the CEO with an annual total compensation of about 484,000 Euro.

The remainder of this paper presents the three systems separately. Then, associations among them are studied based on a regression model, examining the effect of internal mechanisms on the voluntary disclosure. Final section offers conclusions and insights for future research.

II. CONTROL SYSTEMS

Independent directors

Given the well-known recent accounting scandals, corporate governance mechanisms and their impact on companies' behavior are increasingly attracting interest among researchers, managers, and policy makers all around the world. As theorized by the agency theory (e.g., Jensen and Meckling, 1976; Fama and Jensen, 1983b), members of board of directors serve as one of the most important monitoring devices able to reduce the agency costs arising from the separation between ownership and management. In particular, independent directors are not involved in the management activity and have no business relationship with the company, its shareholders, or its managers. They are professionals with neither management role nor business ties to the company, with high institutional expertise, and a reputation to defend. They serve as control systems because they are expected to have an additional role in limiting agency costs, since the risk of collusion with the top management is reduced.

Several empirical studies have already provided evidence that the inclusion of independent directors is actually effective in reducing the control problem in particular settings (e.g., Lee et al., 1992; Kosnik, 1990; Brickley and James, 1987; Weisbach, 1988; Bushee and Noe, 2000; Erhardt et al., 2003; Beasley, 1996). However, no significant correlation was found between independent directors and corporate performance (e.g., MacAvoy et al., 1983; Hermalin and Weisbach, 1991; Mehran, 1995; Klein, 1998; Bhagat and Black, 2000; Dulewicz and Herbert, 2004). More recent studies have also highlighted the role of independent directors in mitigating the dominant shareholder-minority agency conflicts in companies with concentrated ownership (e.g., Anderson and Reeb, 2004; Park and Shin, 2004), but results reached in different settings are not consistent.

Compensation

The explosion in academic research on executive compensation is a relatively recent phenomenon. Murphy (1998) identifies three main causes explaining the vast attention on compensation issues during the past fifteen years: (i) the enormous increase in U.S. CEO compensation; (ii) the "populist attack" against opportunistic and not-social-responsible management style; (iii) the diffusion of stock-based compensation in the bull market of 1900s. Compensation packages contain two basic components: base salary and annual bonus. Salary represents a key component of compensation because it is the basis for all elements in the executive contract: Rosen (1992) shows that base salaries depend on industry, firm size, and span of control. Annual bonus plans tie remuneration to performance: the use of bonuses has extremely relevant implications for incentive (for a well-structured and complete review see Murphy, 1998). Examples of additional forms of compensation are stock options, long-term incentive plans, and retirement plans. Companies design compensation plans to attract new executives, to provide rewards, and to retain high-performance executives (Jensen and Murphy, 1990). Hence, compensation motivates executives towards decision and actions congruent with the ownership's objectives.

We can find empirical research on compensation in several disciplines: accounting, economics, finance, law, organizational behavior, etc. Specifically, accounting research studies incentive implications connected with compensation, investigating performance measures included in the incentive plans (e.g., Ittner et al. , 1997), performance standards used to set performance targets (e.g., Murphy, 2001), and pay-for-performance structures (e.g., Healy, 1985). It has to be noticed that most of the empirical works examines compensation package characteristics disclosed by the company in public available reports. In addition, academic research in this field refers to surveys conducted by human resource

consultancy firms. Few studies analyze proprietary incentive plans provided by the companies.

Voluntary Disclosure

Verrecchia (2001) categorized the literature on disclosure into three research streams: (i) the association-based disclosure stream examines the effect of disclosure on investor's actions; (ii) the discretionary-based disclosure stream examines why companies voluntarily disclose proprietary information; (iii) the efficiency-based disclosure stream examines the optimal level of disclosure. Voluntary (or discretionary) disclosure provides non-mandatory information about financial and non-financial results achieved by managers. Managers have incentives to provide information about their activities since costs to disclose (called *bonding costs*) are lower than costs to monitor activities performed directly by the principals (called *monitoring costs*) (Jensen and Meckling, 1976). According to an economics-oriented perspective, the amount of voluntary disclosure depends on several economic factors, capturing the level of bonding and monitoring costs (e.g., Ahmed and Courtis, 1999). Several prior empirical studies provide evidence that disclosure is used to reduce the control problem (e.g., Chow and Wong-Boren, 1987; Wallace et al., 1994; Meek et al., 1995; Raffournier, 1995; Depoers, 2000; Prencipe, 2004). However, findings are not always consistent (for a comprehensive review see Ahmed and Courtis, 1999).

Empirical research in accounting applies different definition of disclosure and adopts different methods to collect data to measure it. Prior literature mainly adopts two methods to measure the amount of voluntary information contained in the annual reports: published research papers referring to U.S. financial market uses the annual ranking of corporate disclosure practices published by the Association for Investment and Management Research (AIMR) (e.g., Welker, 1995; Bamber and Cheon, 1998); alternatively, other empirical studies use survey instruments designed ad-hoc by the researcher to content analyze the annual

reports (e.g., Botosan, 1997; Depoers, 2000). This study focuses on voluntary disclosure in annual report.

The relationship between the internal and external control systems

Notwithstanding the large amount of research supporting the role of the three systems under investigation as control systems, limited discussion has been carried out about their relationship within the literature.

Prior studies have already tried to empirically test the relationship between independent directors and voluntary disclosure, but they provide limited and inconsistent results not able to support satisfactory conclusions. Forker (1992) argues that the presence of non-executive directors on corporate boards reduces the benefits to withhold information for managers, thus giving incentive to disclose more information. He did not find significant empirical support to his hypothesis. Chen and Jaggi (2000) find that in Hong Kong the total number of independent directors on corporate boards is positively associated with the comprehensiveness of financial disclosures, but they focus on mandatory instead of voluntary disclosure. Thus, their study represents a test of the role of directors in assuring legality. They also show that this association becomes insignificant if the analysis includes only companies with highly concentrated ownership (what they define as "family-controlled firms"). Another Hong Kong-based study (Ho and Wong, 2001) does not find any significant relationship between the proportion of independent directors and the extent of voluntary disclosure provided by listed firms. This result is similar to Haniffa and Cooke (2002) in Malaysia. In Singapore, Eng and Mak (2003) find empirical evidence that an increase in outside directors reduces the level of corporate disclosure. Most of the evidence provided is relative to Asian countries, with the exception of only one study which, on the other side, is focused on "non-executive" (and not specifically "independent") directors. Also, empirical studies linking corporate governance variables and compensation proliferates in accounting literature (e.g.,

Kim, 2005; Hartzell and Straks, 2003; Core et al., 1999; Ke et al., 1999, Mehran, 1995) but our knowledge on the topic is far from robust conclusions mainly because of both the poor measures used to operationalize corporate governance-related variables and the huge difference in the research methods, variables, and analyses adopted by the extant literature (Larcker et al., 2004). The empirical research on the relationship between voluntary disclosure and compensation is less developed. In particular, Nagar et al. (2003) find that discretionary disclosure measured by analysts' subjective ratings is positively related to CEO compensation as measured by proportion of stock-based incentives.

Based on arguments rooted in the agency theory framework, this study hypothesizes that control systems are likely to be complementary, meaning that they are not mutually exclusive, yet they co-exist and foster each other. Specifically, the expectation is that both the number of independent directors on board and the total compensation (internal control systems) are positively correlated with the level of voluntary disclosure (external control system).

Under the assumption of rationality, individuals balance potential benefits against costs whenever they face a decision. Accordingly, in an agency-like setting, managers evaluate costs and benefits to set the level of voluntary disclosure. The costs deriving from more disclosure for insiders consist of a reduction in the advantages connected to the opportunistic behavior; the benefits mainly consist of higher share prices and/or lower takeover risk. Independent directors reduce the opportunities for insiders to get personal benefits from opportunistic behavior, by enhancing internal monitoring. Compensation obtains the same results, by aligning goals through incentives. This implies that the costs deriving from more disclosure decreases, *ceteris paribus*. In other words, independent directors and compensation make the release of more information less costly for the insiders, by producing monitoring

and incentives respectively. Therefore, this study tests whether or not internal systems positively affect voluntary disclosure.

In addition to the above-discussed agency-effect, two additional effects support the expectation of a positive correlation between internal and external control systems. First, I identified a reputation-effect. Independent directors have incentives to defend or build their reputation as expert monitors (e.g., Fama and Jensen, 1983b; Kaplan and Reishus, 1990). As a consequence, they are likely to use disclosure to signal to financial market that they are effectively fulfilling their duties. High compensation generates high reputational concerns too. Companies paying large amounts of money to their CEOs can use annual reports to legitimate compensation packages. In this sense, the bonding mechanisms serve to get consensus for high CEO compensation. Second, there is a mutual reinforcing effect (I call it domino-effect) between different mechanisms. It simply means that the adoption of one control mechanisms is associated with the adoption of another one. Cybernetic theory on control contends that a mutually-inducement characterizes the relationship between exogenous and endogenous control systems (Ashby, 1956). Independent directors not only directly monitor the behavior of the insiders, but also lead them to strengthen and improve other control mechanisms. Likewise, compensation orients the managers to implement systems congruent with the ownership interests. Thus, the domino-effect can potentially explain a positive relationship between internal and external systems. Reputation-effect and domino-effect strengthen both the relationship between independent directors, compensation, and voluntary disclosure and its positive direction as mainly due to the agency effect. Therefore, the statistical analysis tests the following hypothesis.

HP: Internal control systems (i.e., the proportion of independent members on board of directors and the total CEO compensation) are positively correlated with external control system (i.e., level of voluntary disclosure).

III. METHOD

The Italian research setting

As mentioned above, in 1999 a special commission composed of experts and professionals issued a document titled "*Codice di Autodisciplina*" in order to provide listed companies with a non-mandatory benchmark for their corporate governance system (Borsa Italiana, 1999). The document was then revised in 2002. The CGC is a sort of code of best practice designed in the shareholders' interest. As concerns the board of directors' composition, it states that an adequate number of members should be "independent" (Borsa Italiana, 2002). "Independent directors" are defined as non-executive (i.e., outside) directors who (i) have not relevant business relationships with the company, its subsidiaries, its managers, its executive directors, and its controlling shareholders; (ii) are not owners of such a quantity of shares which can give them the power to control the company and are not part of an agreement with other shareholders which gives them the power to control the company; (iii) are not immediate family members of executive directors of the company or of other persons who are in the situations referred to in points (i) and (ii). Since the benchmark model is not mandatory and it does not indicate a fixed number of independent directors to be included in the board, we can find enough variety in the behavior of Italian companies on this issue.

Further, since 1999 CONSOB requires listed companies to provide a table containing data on the compensation package of the CEO and of the members of the board of directors and the board of statutory auditors. The package has to distinguish emoluments, non-monetary benefits, annual bonuses, and other incentives. For each person, the required table has to provide the name, the organizational position, and the length of term.

Data collection

To select the sample, all non-financial companies listed on the Milan Stock Exchange in 2002 (200 in total), were initially considered including all the stock-market segments (i.e., MIB30-

MIDEx; Star, Nuovo Mercato; Others). Since the disclosure policy of foreign companies may be affected by their domestic regulations, we excluded non-Italian companies, in order to avoid possible biases in the results. Secondly, since the analysis is limited to consolidated financial statements, individual companies which were not holdings of groups were excluded form the sample. Third, two companies were excluded since they did not provide information on the exact number of independent directors. Fourth, two companies were excluded because of computational issues related to the data reported in their annual statements. The remaining sample consists of 168 firms. A restricted sample includes compensation data. Companies are required to disclose compensation packages in the individual annual report of the holding company. 31 companies' websites do not provide the annual reports with the information on CEO compensation. I also excluded four companies because of CEO turnover occurred in 2002 and one outlier.[3] The analysis focuses on company with only one explicitly-declared company's CEO.[4] The second final sample including compensation data consists of 102 companies. Table 1.1 provides a summary of the selection process described above.

The CCG released by the sample companies provided information on independent directors. Annual reports provided compensation data and were the basis to assess voluntary disclosure. The dataset is based on the 2002 consolidated annual reports of each sample company. Annual report does not represent the unique source of information disclosed by companies. This is the reason why many authors prefer to adopt official rankings of disclosure level instead of a direct analysis of annual reports. However, the absence of a robust official index ad-hoc constructed for Italian listed companies did not allow using a publicly available ranking. Moreover, Lang and Lundholm (1993) and Botosan (1997) reported a positive

[3] This company is a start-up and reports a value of zero for CEO emoluments.

[4] 30 companies report more than one CEO with different responsibilities and no general CEO for the overall company.

correlation between annual report disclosure level and the amount of disclosure provided via other means. Companies' websites were the main data source to obtain the annual reports.[5] In addition, I referred to data reported in the SpencerStuart Board Index. The consultancy company publishes an annual report on board of directors based on both archival and survey data. The Italian Board Index 2003 provides data on 133 Italian listed companies and refers to the annual reports of year 2002. The report involves both financial and non-financial companies.

Table 1.1 Sample Selection

Market-Segment:	
- *MIB30 & MIDEX*	32
-*Star*	32
-*Nuovo Mercato*	44
-*Other*	92
Population of non-financial listed firms in 2002	200
- Non-Italian companies	(9)
- Individual firms (i.e. non-holding firms)	(19)
- Firms with no info on independent directors	(2)
- Computational issues	(2)
Sample 1	168
- CEO Turnover	(4)
- More than one CEO	(30)
- Annual report n.a.	(31)
- Outlier	(1)
Sample 2	102

Variables measurement

Table 1.2 summarizes the measures used for the dependent and the independent variables and the sources used for data collection.

[5] The website of the Italian Stock Exchange was an additional data source.

Table 1.2 Description and measurement of variables.

Variable	Description	Measurement	Data Source
DSCORE	Disclosure level	Sum of six partial disclosure scores related to different categories of information divided by the maximum score assigned to each company	Consolidated Annual Report
INDIR	Independent directors	Proportion of the independent members on board	Italian Stock Exchange website (www.borsaitalia.it)
TCOMP	Total CEO compensation	Natural logarithm of total CEO compensation	Holding Individual Annual Report
LNSAL	Size	Natural logarithm of total sales	Consolidated Annual Report
LEV	Leverage	Total Assets/Equity	Consolidated Annual Report
OWNDIF	Residual ownership diffusion	Percentage of share capital owned by shareholders who posses less than 2% of the share capital	Italian Stock Exchange Commission website (www.consob.it)
ROI	Profitability	Operating income divided by total assets	Consolidated Annual Report

The proportion of independent directors to the total number of directors (INDIR) measures the influence of external board members, similarly to what has been proposed by earlier studies on the topic (e.g., Larcker et al., 2004; Ho and Wong, 2001; Chen and Jaggi, 2000). The definition of independent directors follows the one reported by the CCG.

The disclosure score adapted from the one proposed by Botosan in 1997 (DSCORE) captures the level of discretionary information, which proved to be a valid measure for disclosure extent. This score is based exclusively on information reported in annual reports and it measures the overall level of disclosure as the result of the score reached by five different categories of information, specifically background information, summary of historical results,

key non-financial statistics, projected information, and management discussion and analysis. Botosan constructed the list of items on the basis of prior literature on corporate disclosure. Regulation has also been considered in order to distinguish voluntary from mandatory pieces of information. Each item is weighted according to its relevance. The same weighting system used by Botosan (1997) was used in the present study.[6] Some modifications adjusted the disclosure score proposed by Botosan in order to tailor it for the Italian setting. Among the most significant changes, the score used in this study eliminates items which are mandatory under the Italian regulation and considers a sixth category of information related to segment disclosure which is voluntary in Italy (Prencipe, 2004). Moreover, the variables measurement avoids penalizing those companies for which not all of the items included in the list are relevant (for example, R&D information for merchandising companies or segment information for single-segment firms). Therefore, a maximum score is set for each company by excluding the items identified as not relevant for it. The level of voluntary disclosure for each company is the total disclosure score (i.e., the sum of the six partial scores) divided by the maximum score assigned to it. Appendix 1A provides the voluntary disclosure assessment instrument.

The empirical analysis includes size, leverage, profitability, and residual ownership diffusion as contingency variables. Similarly to what has been proposed by previous studies on the determinants of corporate disclosure, size is measured through the natural logarithm of sales (LNSIZE), leverage is measured by the total assets to equity ratio (LEV) and residual ownership diffusion is measured by the percentage of share capital owned by unknown shareholders, who are defined as those who possess less than 2% of the share capital of the company (OWNDIF). In Italy, owners of more than 2% of the share capital of a listed company are required to declare their ownership share to the CONSOB. However,

[6] Prof. Botosan provided me the instrument with the instructions to apply it.

shareholders who possess less than 2% of the share capital are unknown. Therefore, the percentage of capital owned by unknown shareholders is calculated as 100% less the total percentage of capital owned by known shareholders. Similar measures were adopted in previous studies on disclosure (e.g., Raffournier, 1995; McKinnon and Dalimunthe, 1993; Prencipe, 2004). Finally, Return on Investment, computed as the Operating Income divided by Total Assets, is the measure for profitability (ROI).

IV. RESULTS

Descriptive Statistics

Table 1.3 reports descriptive statistics on the three control systems under investigation.

Table 1.3. Monitoring, incentives, and bonding within Italian listed companies

	N	Min	Max	Mean	St.Dev.
Independent directors					
# of board members	168	4.00	18	8.71	3.024
# of independent directors	168	0.00	14	3.07	1.929
Percentage of independent directors	168	0.000	1.000	0.361	0.196
Compensation					
Emoluments	102	2.00	1,980	266.500	335.842
Non-monetary incentives	102	0.00	176	3,547	17.695
Bonus	102	0.00	831	59.073	168.127
Other incentives	102	0.00	2,025	154.621	322.439
Total compensation (Euro 0.000)	102	5.00	2,095	483.741	491.578
Voluntary disclosure					
Background information (%)	168	0.000	0.538	0.203	0.107
Historical information (%)	168	0.000	0.900	0.155	0.239
Segment reporting (%)	168	0.000	1.000	0.298	0.188
Non Financial information (%)	168	0.000	0.429	0.078	0.113
Projected information (%)	168	0.000	0.333	0.040	0.068
Management information (%)	168	0.000	0.846	0.233	0.140
DSCORE (%)	168	0.018	0.466	0.156	0.072

The variation in the proportion of independent directors reported by the Italian companies is high, ranging from 0 to 100. The average ratio of independent directors to total directors on the board is 36% (Median = 33%). The average number of independent directors sitting on the board is 3. Six companies declare to have zero independent directors; one company declares that all the members of its board of directors are independent. 44 companies do not disclose whether their independent directors sit on other boards. Among 308 independent directors with the information available, 114 (37%) sit on more than one board. 10 (6%) companies do not specify the names of the independent directors. The Board Index published by SpencerStuart reports 5.5 as the average number of independent directors in the boards of directors of Italian listed companies in 2002. The different mean value from that reported in this study is due to the inclusion of financial companies in the consultancy company's score. Indeed, financial listed companies declare to have more independent directors. Finally, the SpencerStuart index reveals that the average number of independent directors does not dramatically vary over time and across market segments.[7] Overall these results provide initial evidence of the effect of the recent corporate governance regulation within the Italian stock market, showing that independent directors represent at least 10% of the members of the board of directors in 96% of non-financial listed companies.

The investigation of compensation data revealed that companies are very reluctant to disclose this type of information. The use of public data sources available online is one of the main limitations of this study. 31 annual reports of holding companies were available neither on the company's website nor on the website of Milan Stock Exchange, resulting in missing values for the statistical analysis. Moreover, annual reports do not provide any information on the targets, the performance measures, and the evaluation process characterizing the CEO

[7] The SpencerStuart Board Index reports an average number of independent directors of 5.4, 5.5 and 5.6 in year 2002, 2003, and 2004, respectively. In 2002, Mib30-Midex, STAR, Nuovo Mercato, and Others have an average of 8, 3, 3, and 5 independent directors, respectively. The concentration of financial companies in the Mib30-Midex explains the high mean value of independent directors in that segment.

rewarding system. Only 21 companies (21% of total Sample 2) report a variable cash bonus in the CEO compensation packages. For these companies, CEO cash annual bonus represents 32% of total CEO compensation, on average. The total amount of the bonus is not significantly correlated with any of the change in sales, operating income, net income, and assets computed with respect to the previous year. However, the percentage of the variable compensation over total compensation is significantly correlated with the annual sales increase (Pearson Coefficient = 0.398; Sig.(2-tailed) = 0.074). Overall, the average total compensation package is composed by 68% of emoluments, less than 1% of non-monetary incentives, 7% of cash bonus, 24% of other incentives. On average, the CEO of an Italian listed company earned about 484,000 Euro in 2002. The SpencerStuart Board Index reveals that CEO total compensation increased from 2000 to 2002; however, in 2003 CEOs earned less than the previous year, on average.

The mean value of DSCORE is 15% (Median = 15%), with a range of 2% to 47% and the standard deviation is 7%. These results show that there is a good variation in voluntary disclosure practices among Italian listed companies and that the distribution is not skewed. On average, companies disclose high volume of management information to discuss financial results. However, their annual reports contain few projected information on business opportunities and threats. Voluntary disclosure appears to be concentrated on short-term financial information as highlighted by the low percentages of historical information and non-financial information. The information categories are not alternative set of voluntary disclosure as indicated by the significant and positive intercorrelations.[8] The overall amount of information voluntarily disclosed by Italian companies is low (Mean = 15%), suggesting

[8] Further analyses (non-tabulated) show that the amount of information of any category is significantly correlated with that of any other category, except for the segment reporting information that is not significantly correlated with any other information category.

high cost and low benefits connected with the voluntary disclosure in the Italian financial market.

Model

The following regression model is used to test the hypothesized relationship between internal and external control systems:

$$DSCORE_i = \beta_0+\beta_1 INDIR+\beta_2 LTCOMP+\beta_3 LNSAL+\beta_4 LEV+\beta_5 OWNDIF+\beta_6 ROI+\beta_7 DFAM+\varepsilon_i$$

where

i= firm 1 through N (N: sample size);

DSCORE: the disclosure score as the sum of the six partial disclosure scores related to the different categories of information divided by the maximum score assigned to each company;

INDIR= the proportion of the independent members on board;

LTCOMP= natural logarithm of total compensation;

LNSAL= natural logarithm of sales;

LEV: the Total Assets to Equity ratio;

OWNDIF: percentage of share capital owned by shareholders who posses less than 2% of the share capital;

ROI: Operating Income divided by Total Assets;

DFAM: dummy for family-owned companies;

ε= the residual.

The model includes two independent variables for the two internal control systems under investigation: INDIR measures the percentage of independent directors on the total members of the board of directors; LTCOMP measures the natural logarithm of CEO total compensation to reduce heteroskedasticity (Finkelstein and Hambrick, 1989). Based on the reasons explained above, the statistical model controls for firm size (LNSAL), leverage

(LEV), ownership diffusion (OWNDIF), profitability (ROI), and family control (DFAM). To identify family-controlled companies, the accounting literature assumes the threshold of 10% of the share capital. Higher values detect the presence of a dominant shareholder (e.g., Park and Shin, 2004; Chen and Jaggi, 2000). According to this criterion, companies in which one shareholder owns 10% or more of the share capital are characterized by family control (or highly concentrated ownership). Due to the specific economic environment in Italy, all the 168 companies selected have at least one shareholder who owns 10% or more of the shares, so that all of them should be included in the final sample. However, it can be argued that a threshold of 10% can really define highly concentrated ownership. In order to perform an empirical test more consistent with the empirical setting, companies in which the ownership diffusion is lower than 50% were considered to be family-controlled companies.

Table 1.4. Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Dev.
DSCORE	168	0.018	0.47	0.16	0.07
INDIR	168	0.00	1.00	0.36	0.19
LTCOMP					
LNSAL	168	4.88	19.76	12.78	2.24
ROI	168	-0.57	0.97	0.02	0.13
LEV	168	1.01	144.94	5.83	15.43
OWNDIF	168	4.81	100.00	36.91	15.35
DUMMYFAM	168	0.00	1.00	0.86	0.35

Table 1.4 reports descriptive statistics on the variables entered into the model; Table 1.5 reports Pearson correlation coefficients. The univariate analysis reveals that the external and internal control systems are significantly correlated. The existence of multicollinearity among

the independent variables was tested in this study using the Variance Inflation Factor (VIF). VIFs of all the variables were below 2, so that all of them were included in the final model.

Table 1.5. Pearson correlations coefficients

	INDIR	LTCOMP	LNSAL	ROI	LEV	OWNDIF	DFAM
LTCOMP	0.056						
LNSAL	0.077	**0.452****					
ROI	0.026	0.004	**0.274****				
LEV	0.120	**-0.259****	-0.052	**-0.153***			
OWNDIF	0.089	**0.239***	0.074	-0.117	**0.264****		
DFAM	-0.094	-.104	-0.028	**0.214****	**-0.271****	**-0.755****	
DSCORE	**0.239****	**0.340****	**0.321****	0.001	-0.008	**0.204****	-0.049

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The model was separately tested on sample 1 and sample 2. Table 1.6 and table 1.7 present the results. The former table reports the results of sample 1; the latter is based on 102 companies with available compensation data. Both models show a statistically significant F statistics. At the 0.01 level of significance, the hypothesis that all the explanatory variable coefficients are simultaneously equal to zero is rejected in both cases.

INDIR is significantly and positively correlated to the dependent variable. This result supports the hypothesis that independent directors positively affect the level of voluntary disclosure, while controlling for other significant determinants of voluntary disclosure. LTCOMP is not significantly correlated with the DSCORE, while controlling for other determinants. This result is not consistent with the hypothesis that CEO total compensation positively affect the level of voluntary disclosure. Notwithstanding the positive correlation

between external and internal control systems, the multivariate analysis reveals that only monitoring is associated with bonding. Within Italian listed companies, incentives measured as CEO total compensation do not lead to an increase in the voluntary disclosure. As concerns the control variables, LNSAL and OWNDIF are confirmed to be positively related to the level of voluntary disclosure. After adding the compensation variable, DFAM becomes insignificant. This suggests that even after controlling for the ownership structure, the number of independent directors still is positively correlated with the level of voluntary disclosure. Additional analyses were performed in order to test the relationship between the proportion of independent directors and each category of information included in the disclosure score, and specifically: background information, historical results, key non-financial statistics, segment information, projected information, management discussion and analysis.

Table 1.6. Multivariate Least Squares regression results - Sample 1 (168 observations)

$$DSCORE_i = \beta_0 + \beta_1 INDIR_i + \beta_2 LNSAL_i + \beta_3 LEV_i + \beta_4 OWNDIF_i + \beta_5 ROI_i + \beta_6 DFAM + \varepsilon_i$$

	Standardized Coefficients	t	Sig.
(Constant)		**-2.303**	0.023
INDIR	0.218	**3.072**	0.003
LNSAL	0.312	**4.259**	0.000
ROI	-0.113	-1.503	0.135
LEV	-0.060	-0.809	0.420
OWNDIF	0.361	**3.357**	0.001
DFAM	0.261	**2.387**	0.018
Dependent Variable: DSCORE			
F-test	**7.290**		
Sig.	0.000		
Adj. R-Square	18.4%		

DSCORE: the disclosure score as the sum of the six partial disclosure scores related to the different categories of information divided by the maximum score assigned to each company; INDIR= the proportion of the independent members on board; LNSAL= natural logarithm of sales; LEV: the Total Assets to Equity ratio; OWNDIF: percentage of share capital owned by shareholders who posses less than 2% of the share capital; ROI: Operating Income divided by Total Assets; DFAM: dummy taking value 1 as ownership diffusion is lower than 50%.

Table 1.7. Multivariate Least Squares regression results - Sample 2 (102 observations)

$DSCORE_i = \beta_0 + \beta_1 INDIR + \beta_2 LTCOMP + \beta_3 LNSAL + \beta_4 LEV + \beta_5 OWNDIF + \beta_6 ROI + \beta_7 DFAM + \varepsilon_i$

	Standardized Coefficients	t	Sig.
(Constant)		**-1,953**	0,054
INDIR	0,180	**1,956**	0,053
LTCOMP	0,151	1,338	0,184
LNSAL	0,241	**2,338**	0,022
ROI	-0,133	-1,429	0,156
LEV	-0,050	-0,473	0,637
OWNDIF	0,338	**2,324**	0,022
DFAM	0,221	1,565	0,121
Dependent Variable: DSCORE			
F-test	**4,163**		
Sig.	0,000		
Adj. R-Square	18%		

DSCORE: the disclosure score as the sum of the six partial disclosure scores related to the different categories of information divided by the maximum score assigned to each company; INDIR= the proportion of the independent members on board; LTCOMP: natural logarithm of CEO total compensation; LNSAL= natural logarithm of sales; LEV: the Total Assets to Equity ratio; OWNDIF: percentage of share capital owned by shareholders who posses less than 2% of the share capital; ROI: Operating Income divided by Total Assets; DFAM: dummy taking value 1 as ownership diffusion is lower than 50%.

The additional analysis was carried out with reference to the whole sample (168 companies). The results (non-tabulated) show that INDIR is positively related to the level of disclosure as concerns background information, key non-financial statistics, and management discussion and analysis, while no significant relationship was found as concerns the summary of historical results, projected information, and segment information. A tentative interpretation of such results is that independent directors seem to be particularly associated with the disclosure of non-financial and qualitative discretionary information.

V. CONCLUSIONS

This study provides data on the use of monitoring, incentives, and bonding as three control mechanisms adopted to face with the separation between ownership and management. The empirical setting consists of non-financial companies listed on a developing financial market that is the Milan Stock Exchange. The focus is on one system for each control mechanisms, namely: independent directors as monitoring system, CEO total compensation as incentives, and voluntary disclosure as bonding system. The empirical research is based on hand-collected survey data referred to year 2002. The simultaneous investigation of three control systems allows an analysis of their relationships. Agency-, reputation-, and domino-effect explain the expectation of a positive correlation between external (i.e., voluntary disclosure) and internal control systems (i.e., monitoring and incentives). A linear regression model tests the expectation, controlling for other determinants of voluntary disclosure.

Empirical results reveal that Italian companies have a low level of voluntary disclosure which is mainly concentrated on financials-related information. Statistics on independent directors document that recent regulations enhanced corporate governance structures, in particular board independence. CEO compensation data reported by the companies show the lack of linkages between contingent performances and monetary rewards. While controlling for firm size, leverage, profitability, and ownership diffusion, the internal control of independent directors have a positive effect on the bonding control mechanisms operationalized as voluntary disclosure in annual reports. CEO total compensation appears to be strongly influenced by firm size and ownership diffusion and it has no effect on external control mechanisms in a multivariate analysis. These results indicate that CEO compensation has low incentive power within Italian companies as indicated by the low percentage of cash bonus, the statistical independence between financial results and compensation, and the zero effect on voluntary disclosure.

This empirical research has some limitations. It considers one single year to measure the dependent variable which is based on an analysis of 168 annual reports. Moreover, it examines only three selected systems within the broad spectrum of control mechanisms. Lastly, it relies on public available information. Further studies can overcome these boundaries to improve our knowledge on control systems. In particular, this study offers intriguing insights for future research. First, the Italian setting largely consists of family-controlled companies for which the control problem is theorized to be less severe than in other companies. However, this study shows that even in case of high ownership concentration, companies implement corporate governance systems and they do affect external control systems. Future research can investigate more deeply the governance structure of this type of companies to find out determinants and effects of corporate governance in family-controlled companies. Second, empirical evidence reveals that the ownership diffusion significantly influences the control systems. In addition to the management-related aspects, future research should take into account the ownership structure in studying control systems. Finally, the analysis on CEO compensation opens several questions on the role of monetary incentives in attracting, retaining, motivating, and rewarding top managers. Future research can extend the time-horizon of this study and collect more qualitative and private information to explore the role of compensation within the set of control mechanisms implemented by Italian listed companies.

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Evaluation Paper

Balanced performance measurement systems in multinational companies: do they influence decision making?

I. INTRODUCTION

This paper studies performance measurement systems (hereafter PMSs) employed by Italian subsidiaries of multinational companies. In particular, I empirically explore the relationship between balanced PMSs and decision making, by examining the decision-influencing use of performance measures within multinational organizations.

PMSs can be employed for different purposes (e.g., Simons, 1995). Contemporary approaches to performance measurement contend that PMSs should support the achievement of strategic priorities (Langfield-Smith, 1997). They propose a balanced measurement of performance: results should be measured based on different measurement perspectives, including financial and non-financial measures. The literature provides many models for balancing PMSs and many labels for balanced PMSs: for example, Performance Pyramid (McNair, Lynch and Cross, 1990), Balanced Scorecard (Kaplan and Norton, 1992), Tableau de Bord (Epstein and Manzoni, 1998), Intangible Asset Scorecard (Sveiby, 1997), and Strategic Performance Measurement System (Chenhall, 2005). Balanced PMSs are expected to guide and motivate decision-makers operating within the firms towards strategic goals (Kaplan and Norton, 2001; Dixon et al. 1992). The underlying assumption is that balancing PMSs fosters the decision-influencing use of PMSs because it leads to a better understanding of the relation among various strategic objectives, a more effective communication of the association between employees' actions and strategic goals, and a more efficient allocation of resources and priorities based on strategic objectives (Kaplan and Norton, 1996). My research investigates the influence played by PMS (balanced and not-balanced) on strategic decisions within multinational companies.

This study conceives PMS as a control system. PMS plays a key role in controlling and coordinating local operations (Prahalad and Doz, 1987). Headquarters implement PMSs to monitor local results and to influence local managers' decision making. Through the monitoring use of performance measures, headquarters control local activity's results in order to ratify and evaluate management decisions. Through the decision-influencing use of performance measures, headquarters guide local decision making in order to affect initiation and implementation of strategic decisions.

This study analyzes data collected through emailed questionnaires sent to financial controllers of 100 Italian subsidiaries of non-Italian multinational companies. These data capture the design, the balancing, the purposes, and the influence of PMSs on subsidiary's decision making. Results show that the influence of headquarters-initiated PMSs on local decisions is low and alternative management systems guide subsidiary's decision making. Further, the analysis indicates that balancing PMSs *per se* does not increase the influence of PMS on strategic decisions. Finally, the results reveal that local managers tend to develop independent PMSs different from those implemented by headquarters.

Further, this study proposes a categorization of the respondent subsidiaries into four clusters, depending on the decision-influencing use of PMSs. I call the cluster of subsidiaries with high decision-influencing use of headquarters-initiated PMSs "Dominant Central PMS". I group subsidiaries with low decision-influencing use of PMS in the cluster called "Alternative Mechanisms". Those with low decision-influencing use of headquarters-initiated PMS and high decision-influencing use of locally-developed PMSs form the "Dominant Local PMS" cluster. Finally, the "Competing PMSs" cluster includes all the subsidiaries with high decision-influencing use of headquarters-initiated PMS and high decision-influencing use of locally developed PMSs.

In addition to the quantitative analysis, discussion on empirical evidence refers to qualitative information collected through a focus group with nine respondents to the questionnaire. The focus group analyzed the data and discussed the role of balanced PMSs in guiding subsidiary's decision making from a managerial standpoint.

The explorative research approach enables this study to offer several contributions. First, this study is one of few examining the adoption of balanced PMSs for controlling subsidiaries of multinational companies: the new paradigm of multinational company as a network of differentiated relationships challenges PMS-related research (Dent, 1996). Results show that PMSs can have very low influence on decision making and the interaction with the mix of control mechanisms is essential to understand how headquarters manage local subsidiaries. Second, this study reports data on the diffusion of balanced PMSs in Italy where very limited empirical evidence on this topic is available, especially regarding with multinational organizations (Dossi, 2003). Fifty seven percent of the companies in the final sample use PMS with financial and non-financial perspectives. Third, the empirical research distinguishes between the existence and the use of PMS, by examining not only the structural characteristics of PMSs (e.g., performance measures), but also the use of PMSs by local subsidiaries (e.g., decision-influencing use). Simons (1995) explained the practical relevance of this distinction and Langfield-Smith (1997) documented how the difference between the existence and the use of PMSs was not acknowledged in many studies. Fourth, findings reveal the de-coupling of PMSs within multinational companies: subsidiaries autonomously developed local PMSs different from those initiated by headquarters. This phenomenon has not been analyzed in the extant literature: empirical evidence documents this is a frequent case and the study attempts to propose predictors and consequences. Last, my theoretical arguments combine literature from international business and management control systems in order to enhance research question generation and results discussion; and data collection and

analysis adopt a multi-research method approach in order to enrich conclusions and implications. Cross-fertilization between disciplines and multiple research methods attempt to overcome common constraints of empirical accounting research (Merchant et al., 2003).

The next section discusses the role of PMSs in multinational companies. I then present three research questions. I follow this with a presentation of method and results. Finally, I conclude and provide directions for future research.

Performance measurement systems in multinational companies

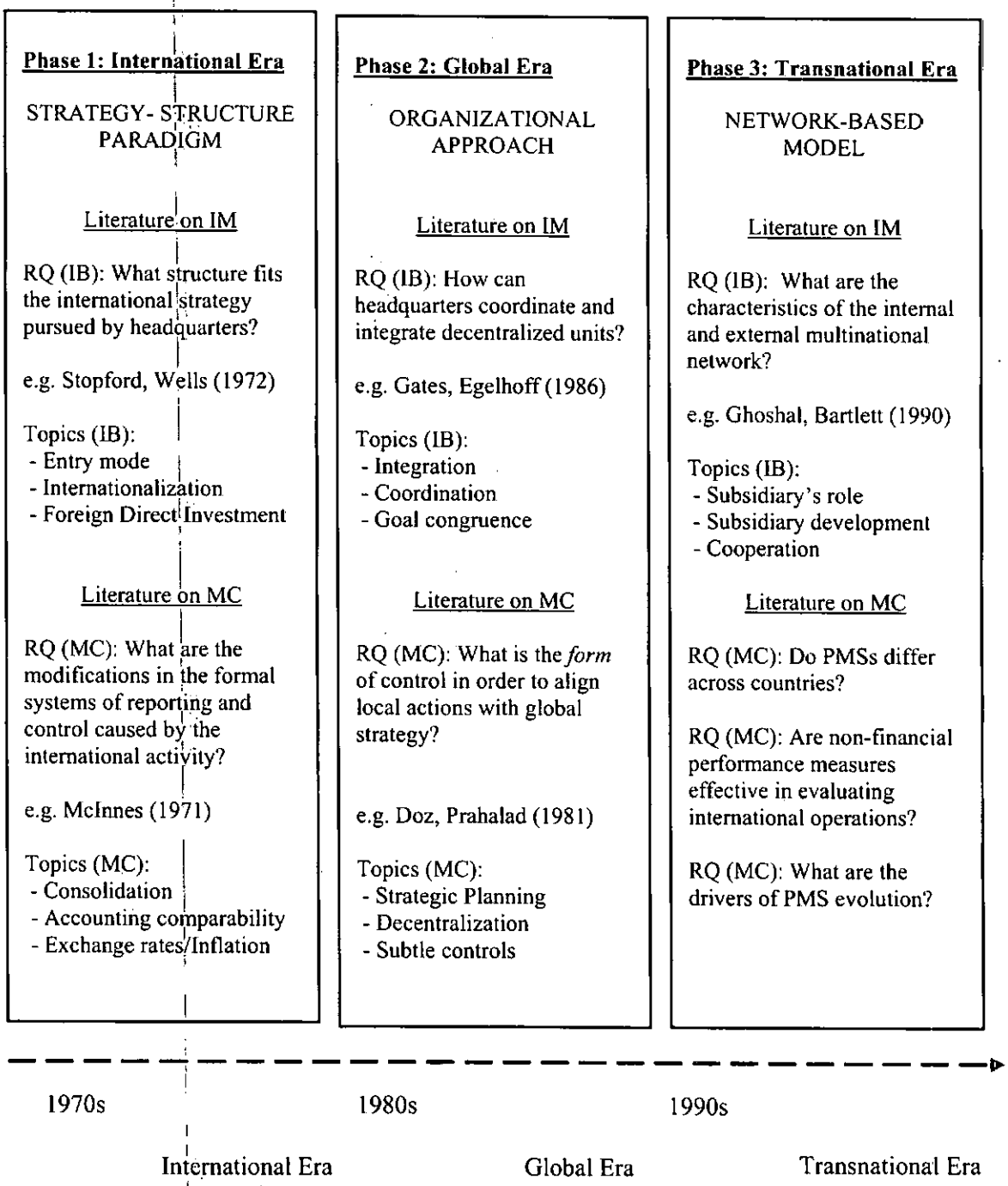
Within the international business literature on headquarters-subsidiary relationships, three main phases are observed. Each of them assigns different tasks to PMSs. Figure 2.1 schematizes the research questions addressed by the international business literature and by management control systems research during the three phases.

Early studies on headquarters-subsidiary management appeared in the 1970s, shortly after the boom of foreign direct investment in western countries. Harzing (1999) calls this phase the *International Era*. Researchers devoted their efforts to studying the organizational structure of multinational companies. One of the most popular studies is the life-cycle model for international trade proposed by Vernon (1966). According to his model, the foreign investment choice of a company is connected to the product life-cycle. When the home market is exhausted, the company seeks to expand abroad through export, and later through production plants in foreign countries, and lastly through dispersed local units with highly specialized mandates. The assumption that organization is supposed to follow strategy (Chandler, 1962) led to investigate the different organizational structures fitting the internationalization strategy. Stopford and Wells (1972) proposed an evolution pattern of organizational structures used to manage multinational companies. In their model they presented four typologies (i.e., International Division, Worldwide Product Division, Area

Division, Global Matrix) as a function of the foreign product diversity and the percentage of foreign sales.

Figure 2.1 The evolution of international business issues.

*This Figure represents the evolution of international business studies on headquarters-subsidiary relationship over time. Within the literature, three phases are identified corresponding to the three eras of time proposed by Harzing (1999). For each phases, topics and research questions (*RQ*) on both international business* (IM) *and management control* (MC) *are presented.* (PMS: *performance measurement system*)



In the *International Era*, within management control system research, McInnes (1971) surveyed the financial reporting and control used by 30 American multinational companies. He intended to explore the effect of the multinational operations on the accounting comparability and standardization in performance measurement and evaluation. Thus, in the first phase, PMSs was mainly considered as accounting-based mechanisms: their task was restricted to measure and consolidate financial results of decentralized units.

The second phase corresponds to the *Global Era* where internationalization was viewed by the management literature as the solution of the search for efficient location of production, economies of scale, and rationalization of activities (Harzing, 1999). At that time, Levitt (1983) invoked a global imagination where the world is seen as a single marketplace entity. Coordination and integration of dispersed subsidiaries became the key issue for international management. Martinez and Jarillo (1991) pointed out that coordination mechanisms can be formal and subtle. Moreover, Doz and Prahalad (1981) categorized the management systems designed to coordinate actions and decisions throughout the multinational organization into three groups: (i) data management (PMS, strategic planning, etc.), (ii) manager's motivation management (career paths, reward systems, etc.); (iii) conflict management (task forces, coordination committees, etc.).

In the *Global Era*, PMSs were considered as an organizational mechanism: their task was not only to report and monitor financial results, but also to influence local behaviors through more pervasive performance measures.

Lastly, in the *Transnational Era*, the international business literature conceives the organizational structure of modern multinational companies as a differentiated network rather than as a broad structural archetype like an area, a product, or a matrix structure (Nohria and Ghoshal, 1997). Malnight (1996) summarizes the key characteristics of network-based multinational companies. These companies (i) pursue an integrated worldwide strategy with

differentiated contributions by geographically-dispersed operations; (ii) encompass distributed, specialized and interdependent resources and capabilities; and (iii) possess complex mechanisms of coordination and cooperation in an environment of shared decision making. Thus, the multinational company operates as a web of relationships shaping a complex structure of centralization and delegation mechanisms (Ghoshal and Bartlett, 1990). The network-based multinational company has shifted the research focus from the headquarters level to the subsidiary level. Headquarter is no longer the sole source of competitive advantage for the firm (Birkinshaw, 1997). The subsidiary is a value-adding node of a network. Birkinshaw and Hood (1998) define the subsidiary as a semi-autonomous entity, capable of making its own decisions but constrained in its action by the demands of head-office managers and by the opportunities in the local environment.

As pointed out by Dent (1996), the evolution in multinational companies from highly decentralized corporations towards network-based organizations challenges management control systems design, offering new avenues for research. However, there is a lack of academic contributions on PMSs within this type of organizations. On the one hand, international business research emphasizes the different mix of mechanisms to manage subsidiaries, but it does not deal with any specific control systems (e.g., Nohria and Ghoshal, 1994). On the other hand, management control systems research focuses on structural characteristics, but it does not consider the different ways to use them, as pointed out by Langfield-Smith (1997). In his qualitative paper, Dent (1996) argues that balancing multiple perspectives in performance measurement is one of the main challenges arising from modern multinational companies. By providing initial evidence on the diffusion of balanced PMSs within multinational companies, this paper can be considered as one of the first empirical studies of Dent's framework.

Table 2.1. International business studies on management control systems

The international business studies listed in this table assume that the internal strategic differentiation and organizational complexity within multinational companies affect management control systems. For each paper, this table provides the contextual factors and the management control systems-related variables considered in the studies.

PAPER	CONTEXTUAL FACTORS	MANAGEMENT CONTROL SYSTEMS-RELATED VARIABLES
Prahalad and Doz, 1987	Need for Local Responsiveness Need for Integration	Strategic Control: Data Management Tools Managers' Management Tools Conflict Resolution Tools
Ghoshal and Nohria, 1989	Environmental complexity Local Resources	Centralization Formalization Socialization
Gupta and Govindarajan, 1991	Outflow of knowledge from the focal subsidiary to the rest of the corporation Inflow of knowledge from the rest of the corporation to the focal subsidiary	Corporate Control: Formal integrative mechanisms Basis for bonus determination Budget evaluation style Reliance on outcome versus behavior control Subsidiary manager's locus of control Size of bonus relative to salary
Anderssson and Forsgren, 1996	Subsidiary embeddedness Subsidiary's external embeddedness Corporate embeddedness	Perceived control
Tseng, Yu, and Seetoo, 2002	The knowledge transaction density with local firms The knowledge transaction density with a MNC's enterprise group	Bureaucratic Management Mechanism Personnel Management Mechanism Performance Management Mechanism Cultural Management Mechanism
Birkinshaw, Holm, Thilenius, and Arvisson, 2000	Perception Gap HQ-subsidiary cooperation	HQ Control
O' Donnell, 2000	Lateral Centralization Subsidiary Autonomy Outcome Measurability Industry Volatility Host Country Volatility HQ-Sub International Interdependence Inter-sub. International Interdependence	Bureaucratic Monitoring Headquarters Supervision Monetary Incentives Vertical Integrating Mechanisms Lateral Integrating Mechanisms Career Incentives Subsidiary Incentives

Table 2.2. The subsidiary role stream of international business literature (adapted from *Paterson and Brock, 2002*)

This table provides a schematized review of both empirical and conceptual researches proposing categorizations of subsidiaries' roles. For each research, table reports: (i) the authors; (ii) the research methodology; (iii) the variables used to categorize subsidiary's roles; (iv) the unit of analysis considered by the research; (v) the various labels used to name subsidiary's role.

Papers	Empirical/ Conceptual	Variables	Unit of Analysis	Taxonomies
White and Poynter, 1984	Conceptual	Product scope Mkt scope	Subsidiary	i) Miniature Replica ii) Product Specialist iii) Strategic Independent
Bartlett and Ghoshal, 1986	Empirical	Competence vs strategic importance	Specific Subsidiary	i) Local Implementer ii) Contributor iii) Strategic Leader
Prahalad and Doz 1987	Empirical	Integration/ Responsiveness	Whole organization	i) Locally responsive strategy ii) Integrated Product strategy iii) Multifocal strategy
Jarillo and Martinez, 1990	Empirical	Integration/ Localization	Specific Subsidiary	i) Receptive subsidiary ii) Autonomous subsidiary iii) Active subsidiary
Gupta and Govindarajan, 1991	Conceptual	Knowledge outflows and inflows	Subsidiaries relative to others in company	i) Local Innovator ii) Implementer iii) Global Innovator iv) Integrated player
Roth and Morrison, 1992	Empirical	Competencies and Interdependencies	Specific Subsidiary	i) Domestic product specialization ii) International product innovation
Birkinshaw and Morrison, 1995	Empirical	Autonomy, integration of activities	Subsidiaries relative to others in firm	i) Local implementer ii) Specialized contributor iii) World mandate
Taggart, 1997a	Empirical	Coordination and configuration	Specific Subsidiary	i) Quiescent ii) Receptive iii) Active iv) Autonomous
Taggart, 1997b	Empirical	Autonomy/ Procedural Justice	Specific Subsidiary	i) Vassal ii) Collaborator iii) Partner iv) Militant

II. RESEARCH QUESTIONS

Multinational companies as a research context

The purpose of this paper is to study PMSs within multinational companies. Roth and Kostova (2003) present multinational companies as an insightful research setting to validate established theories. Multinational companies are one of the most complex cases of organization because they are characterized by substantial heterogeneity, complexity and variability. The *contextual heterogeneity* depends upon the multiplicity and diversity of the external environments. The *inter-organizational complexity* refers to the various organizational configurations assumed, the different strategic objectives pursued, and the several management mechanisms implemented by the various units with the multinational company. The *individual variability* is related to the variety of individual backgrounds, beliefs, values, experiences, and cognitive maps. From an empirical point of view, heterogeneity, complexity and variability increase the variance in the data. From a conceptual point of view, they call for additional constructs, or relationships among the constructs. Thus, multinational companies represent an intriguing context to both empirically test existing theories and conceptually discover theoretical extensions.

Research on PMSs can benefit from this kind of empirical settings. Theory, research, and practice document the impact of the multinationals-related environmental heterogeneity, organizational complexity, and individual variability on PMSs. Above all, contingency-based theory on control systems posits that PMSs differ depending on contextual variables (Chenhall, 2003). Second, many empirical studies deal with the effect of multinationals organizational complexity on control mechanisms (see Table 2.1). The recent international business literature emphasizes that the network-based multinational company implies differentiated roles for subsidiaries within a complex structure of organizational relationships. Subsidiary strategic objectives and subsidiary organizational structures depend on

headquarters' mandate, local business competitive pressure, and subsidiary's entrepreneurship (Birkinshaw and Hood, 1998). Academic literature provides several categorizations for subsidiary roles (see Table 2.2); managerial-oriented studies underline the need for rethinking multinational organizations due to internal strategic and organizational differentiation (e.g., Collis and Johnson, 1995; Lipparini and Fratocchi, 1999; Prahalad and Lieberthal, 2004). Finally, within multinational companies several individual models of thinking coexist and this can generate a lack of understanding (Norreklit and Schoenfeld, 2000). Empirical research shows that the individual variability in beliefs, values, and perceptions has significant impacts on both headquarters control and subsidiary cooperation (Birkinshaw et al., 2000).

All these arguments point out the distinctiveness of the multinationals setting to study PMS as a system supposed to influence decision making.

Contemporary approach to PMS

The focus of this study is on the influence of PMS on decision making. Headquarters implement PMS to monitor local results and to influence decision making. Initiation, implementation, ratification, and monitoring are the four fundamental elements of the decision making process, according to Fama and Jensen (1983). Initiation and implementation of decisions refer to decision management; ratification and monitoring of decisions refer to decision control. Through the monitoring use of performance measures, headquarters examine subsidiary results in order to ratify and evaluate subsidiary decisions. Through the decision-influencing use of performance measures, headquarters guide subsidiary decision making in order to affect initiation and implementation of subsidiary decisions.

Contemporary approaches to PMSs advocate the design of balanced PMSs in order to better understand, measure, and communicate how performance results are achieved (Langfield-

Smith, 1997). Balanced PMSs represent a multidimensional approach to performance measurement: they adopt non-financial indicators in addition to the traditional financial perspective based on accounting measures in order to better capture the desired strategy.

In the academic literature, the adoption of non-financial indicators has been often discussed in light of the limitations of financial measures. Non-financial measures are considered to be more forward-looking (Johnson and Kaplan, 1987), more able to predict future performance (Behn and Riley, 1999), more adequate to measure intangible assets (Stewart, 1997), more abstract and synthetic (Kaplan and Atkinson, 1998), and less subject to manipulation (Rees and Sutcliffe, 1994) than accounting-based (i.e., financial) indicators. Furthermore, Brancato (1995) underlines two additional factors explaining the emergence of non-financial measures. First, the increase in competitive pressures perceived by firms leads to a more analytical measurement in order to monitor both operational and strategic value drivers, and to define causal links among the several drivers; second, the implementation of advanced management techniques (such as Total Quality Management programs, manufacturing systems innovations, team-based structures, etc.) requires new indicators to satisfy the related information need.[9]

Recently, Ittner et al. (2003) used the term "measurement diversity" to identify the distinctiveness of balanced PMSs, consisting in the broad spectrum of perspectives involved in the measurement process. Balanced PMSs are not simply considered as sophisticated measurement tools to report and monitor performance results. According to Kaplan and Norton (1996), the measurement diversity approach allows manager to focus planning, control, and incentives on strategic priorities. Therefore, the scope of balanced PMSs is supposed to go beyond performance measurement and to include processes such as strategy formation, strategy implementation, management control, and incentives (Otley, 1999).

[9] On the choice of performance measures, see also Van der Stede (2006).

Empirical research on balanced PMSs reflects these two theoretical aspects. Some studies test the ability of non-financial measures to predict financial performance. Rees and Sutcliffe (1994) test that non-financial measures are not lag-indicators because they give the opportunity to take immediate corrective actions, and that manipulation is more difficult in case of non-financial measures, because they are less dependent on managerial judgment; Foster and Gupta (1997), Ittner and Larcker (1998), and Banker et al. (2000) report the positive correlation between non-financial indicators and financial performance measures. Other researches deal with the second aspect: they attempt to investigate the impacts of the adoption of balanced PMSs on managerial processes. Lingle and Schiemann (1996), Hoque and James (2000), and Said et al. (2003) focus their analysis on the connection between higher firm performance and the emphasis placed on broad sets of performance measures. The experiment conducted by Lipe and Salterio (2000) shows the consequences of balanced PMSs in the judgment process, limiting the observation to the different effects of unique and common information. Malina and Selto (2001) report findings about the use of a balanced PMS to communicate and control corporate strategy. The structural equation model proposed by Chenhall (2005) tests the influence of balanced PMSs on strategic alignment of manufacturing and organizational learning, assuming that the consequences of the measurement diversity approach on performance is mediated through these two intervening elements. Ittner et al. (2003) analyze the adoption of balanced PMSs for four different managerial processes (identifying problems and improvement opportunities and developing actions plan; evaluating major capital investments; evaluating managerial performance; and disclosing information to external parties).

The underlying assumption of the contemporary approach to PMSs is that balancing PMSs fosters the decision-influencing use of PMSs because it leads to a better understanding of the relation among various strategic objectives, a more effective communication of the

association between employees' actions and strategic goals, and a more efficient allocation of resources and priorities based on strategic objectives (Kaplan and Norton, 1996). My main research objective is to examine the influence of PMSs on subsidiary's decision making, providing evidence on antecedents and consequences of the decision-influencing use of PMS. Particular interest is on the effect of balancing PMSs.

Research questions

This paper addresses three research questions.

First, this study investigates how headquarters design and implement PMSs in local subsidiaries. With a centralized (or hierarchical) design, headquarters include in the PMS a set of performance measures selected at the headquarters office. In contrast, with a decentralized (or autonomous) design, subsidiaries autonomously design their PMSs and headquarters ratify it. Much research on budgeting shows how decentralization affects performance measurement characteristics (e.g., Merchant, 1981; Brownell, 1985; Chenhall and Morris, 1986). However, they typically focus on organizational autonomy (i.e., the formal authority to make decisions relating to resources). Contemporary approaches to PMSs emphasize the importance of the design and implementation process for PMS effectiveness (e.g., Kaplan and Norton 2001; Malina and Selto, 2001). Therefore, this study examines the level of subsidiaries participation in PMS design and implementation processes.

This study also investigates why headquarters implement PMSs, since they can be employed with different purposes. According to Merchant and Van der Stede (2002), results control consists of allocating economic responsibility and decision rights, setting performance targets, and rewarding results. According to Simons (2000), information for performance measurement and control can serve for decision making, planning, control, signaling, education and learning, and external communication. According to Otley (1999), performance measurement and management refers to goal definition, strategy deployment,

benchmarking, human resource management, and feedback processes of learning organizations. Moreover, PMSs can have different tasks as a control system within multinational companies (as discussed in a previous section). For example, they can serve as data reporting systems or as performance-based reward systems. Therefore, this study examines the effect of PMS purpose on its decision-influencing use within subsidiaries.

Last, this study investigates how contextual factors affect PMSs. Contingency-based research suggests including contingency-related variables in the study of PMSs (Chenhall, 2003). This study examines three contextual factors. First, it examines the global pressure as one factor of the subsidiary's competitive environment (Prahalad and Doz, 1987). Second, it examines subsidiary's size that is a proxy for several constructs such as local resources, power, and maturity (Chenhall, 2003). Third, it examines uncertainty avoidance as a cultural characteristic referred to headquarters' country that influences PMS attributes (e.g., Chow et al. 1999). Based on this discussion on design, purposes, and contingency variables associated to PMSs, this paper addresses the first question:

RQ 1: What are the antecedents of the PMSs influence on subsidiaries' decision making?

Second, this study focuses on balanced PMSs. As discussed in a previous section, advocates of combinations of measures assume a better initiation and implementation of decisions (i.e., decision management) when PMSs are balanced. Therefore, this study examines the effect of multiple performance measurement perspectives on the decision-influencing use of PMS, by addressing the following question:

RQ 2: Do multiple performance measurement perspectives lead to higher decision-influencing use of PMSs?

Third, this study investigates the consequences of the decision-influencing use of PMSs by studying what drives subsidiaries' strategic decision making. Through the decision-

influencing use, PMSs orients decision making towards strategic objectives. However, aligning decisions is particularly complex in multinational companies because of several reasons. First, different strategic objectives coexist within the same multinational organization (Ghoshal and Nohria, 1989). As discussed in a previous section, in modern network-based multinational companies, subsidiaries pursue differentiated strategies. Within this kind of context, control systems serve to achieve strategic alignment throughout the organization (Nohria and Ghoshal, 1994). Furthermore, headquarters and subsidiaries perceive strategic objectives and related performance measures differently (Daley et al., 1985). Therefore, transplanting domestic PMSs into foreign countries is not always feasible because of different individual thinking and control. Lack of understanding between working groups in headquarters and subsidiaries depends on different business environments and different background knowledge and culturally-determined value systems (Noerreklit and Schoenfeld, 2000). This cognitive diversity hinders cooperation and coordination of local operations (Birkinshaw et al., 2000). Finally, local environments have different peculiar environmental factors. Social, technological, economic, and political influences determine the subsidiary's operating environment (Cravens, 1982). These external forces imply the coexistence of a wide environmental variety within the same multinational company. As a consequence, uniformization of processes is not easily adoptable and sophisticated coordination mechanisms are essential to align local subsidiaries towards global strategic objectives. Therefore, this study examines what influences decision making within subsidiaries and it infers the related impacts on strategic alignment throughout the multinational organization. Based on this discussion, this paper addresses the last research question:

RQ 3: What are the consequences of the PMSs influence on subsidiaries' decision making?

Table 2.3: Operationalization

Construct	Variable (ABBREV.)	Measure	Scale	Reference	Questionnaire question
Balanced PMS	Measurement Perspectives (PERSP)	Number of perspectives contained in the PMS-initiated by the headquarters	1 - 4	Chenhall (2005)	Question 3
PMS design	Design (DESIGN)	Level of subsidiary's participation in designing PMS	1 - 4	Ad-hoc constructed instrument	Question 2
PMS purpose	Purposes of the headquarters-initiated PMS (CENTPUR)	Reporting versus Rewarding purposes	0 - 1	Ad-hoc constructed instrument	Question 9
Business Environment	Global Pressure (GLOBP)	One 4-item question	1 - 5	Prahalad and Doz (1987)	Question 11
Decision influencing use of PMS	Influence on subsidiary's Sales&Marketing decisions (INFSAL)	One 5-item question	1 - 5	Prahalad and Doz (1987)	Question 10 (first 5 items)
	Influence on subsidiary's Production&R&D decisions (INFPRD)	One 5-item question	1 - 5	Prahalad and Doz (1987)	Question 10 (items 6-10)
	Influence on subsidiary's HRManagement decisions (INFHR)	One 5-item question	1 - 5	Prahalad and Doz (1987)	Question 10 (last 5 items)
	Overall Influence on subsidiary's strategic decisions (INFTOT)	Mean value of the previous three variables	1 - 5	Prahalad and Doz (1987)	Question 10 (15 items)
Culture	Uncertainty Avoidance Index (UAI)	Hofstede™	1 - 100	Hofstede (1980, 1991)	-
Size	Number of Employees (LNSIZE)	Natural logarithm of subsidiary's employee	0 - ∞	(for a review see Chenhall, 2003)	Question 12
PMS Decoupling	Use of an independently developed PMS different from the headquarters-initiated PMS (LOCPMS)	One "YES or NO" question	0-1	Ad-hoc constructed instrument	Question 4

Table 2.4. Variables Description

Variables	Description
AMM	Importance of administrative issues to explain the development of PMS (Scale 1-5)
ANALIT	Importance of need for analyticity to explain the development of PMS (Scale 1-5)
CENTPUR	Dummy for PMS's purpose
CLUST	Clusters (DP: Dominant Central; AM: Alternative Mechanisms; DL: Dominant Local; CP: Competing PMSs)
DESIGN	PMS's Design approach (Scale 1-4)
DIFF	Difference between central and local PMS (Categorical Variable)
GLOBP	Global pressure index (Scale 1-5)
INAD	Importance of inadequacy of central PMS to explain the development of PMS (Scale 1-5)
INFHR	Influence of PMS on human resource management-related decisions (Scale 1-5)
INFHRL	Influence of local PMS on human resource management-related decisions (Scale 1-5)
INFPRD	Influence of PMS on production- and R&D-related decisions (Scale 1-5)
INFPRDL	Influence of local PMS on production- and R&D-related decisions (Scale 1-5)
INFSAL	Influence of PMS on sales- and marketing-related decisions (Scale 1-5)
INFSALL	Influence of local PMS on sales- and marketing-related decisions (Scale 1-5)
INFTOT	Overall influence of PMS on subsidiary's decisions (Average of INFSAL, INFPRD, INFHR) (Scale 1-5)
INFTOTL	Overall influence of local PMS on subsidiary's decisions (Average of INFSALL, INFPRDL, INFHRL) (Scale 1-5)
INTEG	Importance of lack of integrated information systems to explain the development of PMS (Scale 1-5)
LNSIZE	Natural logarithm of number of subsidiary's employees (Continuous Variable)
LOCPMS	Dummy for the use of an independently PMS developed by the subsidiary
LOCPUR	Dummy for local PMS's purpose
PART	Dummy for subsidiary's participation in designing PMS
PERSP	Number of measurement perspectives contained in PMS (Scale 1-4)
POSYRS	Tenure (years) in current position for the focus group participants (Continuous Variable)
SIZE	Number of subsidiary's employees (Continuous Variable)
UAI	Uncertainty avoidance index (Scale 1-100)

III. METHOD

The exploratory research is intended to discuss the decision-influencing use of PMSs within multinational companies. I collected data through questionnaires and a focus group.

Table 2.5. Sample Nationality Composition

	Frequency	%	% UNCTAD[a]	UAI[b]
Belgium	1	1.9	-	94
Denmark	2	3.7	-	23
Finland	1	1.9	1.0	59
France	3	5.6	13.0	86
Germany	11	20.4	12.0	65
Japan	2	3.7	18.0	92
Netherlands	2	3.7	2.0	53
Spain	1	1.9	2.0	86
Sweden	2	3.7	3.0	29
Switzerland	1	1.9	4.0	58
UK	4	7.4	5.0	35
USA	25	44.4	26.0	46
Total	54	100.0	86.0	

[a]%UNCTAD: Percentage referred to the country of origin of the world's 100 largest multinational companies. ranked by foreign assets. 1999 (UNCTAD. World Investment Report. 2001). The ranking includes 9 multinational companies of the final sample.

[b]Uncertainty Avoidance Risk (UAI): Hofsted's index which focuses on the level of tolerance for uncertainty and ambiguity within the society - i.e. unstructured situations. A High Uncertainty Avoidance ranking indicates the country has a low tolerance for uncertainty and ambiguity. This creates a rule-oriented society that institutes laws. rules. regulations. and controls in order to reduce the amount of uncertainty. A Low Uncertainty Avoidance ranking indicates the country has less concern about ambiguity and uncertainty and has more tolerance for a variety of opinions. This is reflected in a society that is less rule-oriented. more readily accepts change. and takes more and greater risks. Italy's UAI is 75. (Hofstede 1980. 1991).

Among the several research methods used in managerial accounting research, surveys have high descriptive power (e.g., Abernethy et al., 1999). In particular, they offer the opportunity to examine the research object and the supposed related variables in their natural settings, enhancing the significance of the analysis (Brownell, 1995). This research is based on questionnaires emailed to 100 financial controllers of Italian subsidiaries of non-Italian

multinational companies. Financial controllers were selected as the most adequate category of respondents, because they use PMSs daily and discuss the reported performance measures with top management.[10] I selected target subsidiaries on the basis of ease of access to the researchers.[11] The sample includes subsidiaries operating in several industries. Although the sample is non-random, the diversity in industries and in nationalities enhances the generalizabilty of the results.[12] The questionnaire (shown in Appendix 1A) asked questions about PMSs' design, PMSs' balancing, PMSs' purposes, and influence of PMS on local decisions.[13] I designed it with the cooperation of two Chief Financial Officers; pilot testing with practitioners and academic colleagues was conducted in order to ensure that variables of interest were relevant and to remove any ambiguity in the wording of the questions. Table 2.3 summarizes the operationalization underlying our analysis; Table 2.4 describes the measures constructed for the analysis. A total of 70 (response rate 70%) questionnaires are returned[14]. Many respondents added personal comments, indicating the relevance of PMS-related issues perceived by subsidiaries. Thirteen questionnaires are not useable[15]. Three questionnaires were excluded from the analysis because subsidiaries do not have a PMS to formally report performance results to the headquarters on a regular basis. In the personal comments section of the questionnaire, one respondent explained that the company implemented only one single worldwide information system database and only the head office had the authority to extract, produce, and analyze performance measures. The final sample includes 54 subsidiaries. On average, sample subsidiaries have approximately 650 employees (Median

[10] On average, respondents had been in their current position for 4 years (Median: 3 years; range: 4 months to 30 years).

[11] As an example of an accounting research paper using the same sampling procedure, see Ross (1994).

[12] Van der Stede et al. (2005) report that 71% of survey studies published on eight top accounting journals over a 20-year period (1982-2001) uses non-probability samples.

[13] I administered the questionnaires in Italian to facilitate responses. Appendix 1A reports the English version.

[14] Recently, Van der Stede et al. (2006) reported that the average response rate in management accounting research is 55%.

[15] Twelve questionnaires were excluded from the analysis because of incompleteness; one was excluded because it was received from a subsidiary which was acquired by an Italian multinational company shortly before the questionnaire was sent.

206) and the related multinational companies have approximately 41,200 employees (Median 30,300). Table 2.5 and 2.6 provide further descriptive statistics on the sample and compare final sample, in terms of industry and parent company country of origin, with statistics on multinational companies reported by UNCTAD 2001. Industries and nationalities included in the final sample cover 85% and 86% of those of the world's 100 largest multinational companies, respectively.

Table 2.6. Sample Industry Composition

Industry	Frequency	%	%UNCTAD[a]
Apparel	1	1.9	-
Automotive	5	9.3	14.0
Business Services	2	3.7	-
Chemical and Allied Products	18	33.3	14.0
Consumer Products	3	5.6	1.0
Domestic Appliances	3	5.6	4.0
Food & Beverages	2	3.7	9.0
Industrial & Commercial Machinery	10	18.5	20.0
Insurance	2	3.7	-
Media	2	3.7	3.0
Oil	1	1.9	12.0
Telecommunications	4	7.4	3.0
Utilities	1	1.9	5.0
Total	54	100.0	85.0

[a]%UNCTAD: percentage referred to the country of origin of the world's 100 largest multinational companies, ranked by foreign assets, 1999 (UNCTAD, World Investment Report, 2001).

Focus groups are usually used to expand the efficacy of a survey: they help researchers to understand why respondents answered the way they did (Bailey, 1994). The interaction among the participants is the main advantage of this research technique, which provides detailed descriptions on, and mutual comparison between, different experiences (Morgan,

1996). For this study, the focus group involved nine respondents to the emailed questionnaire, one interviewer researcher, and one research assistant. Table 2.7 reports descriptive statistics on the subsidiary participants. Two weeks before the focus group meeting, participants received an executive summary about the survey's findings. The focus group meeting was structured into four consecutive phases: (i) results presentation by the interviewer researcher; (ii) results discussions by the Chief Financial Officer of a subsidiary using a balanced PMS implemented by the headquarters in all its units; (iii) unstructured discussion involving all the participants; and (iv) three questions targeted by the interviewer researcher to specific participants. Focus group discussion was taped and transcribed.

IV. FINDINGS

Descriptive Statistics

In order to examine the effect of PMS on subsidiaries' decision making, the analysis focuses on three PMS-related variables: number of measurement perspectives (PERSP), subsidiary's participation in designing performance measures reported to headquarters (PART), and PMSs' purpose (CENTPUR) that is, the reason for which subsidiary management uses the performance measures reported to headquarters. The survey instrument considers five sales and marketing decisions (INFSAL), five production and R&D decisions (INFPRD), and five human resource management decisions (INFHR): according to Prahalad and Doz (1987), these fifteen decisions describe the spectrum of subsidiary's decision making. The average influence played by the PMS is measured for each of the three groups of decisions. A synthetic variable measures the total influence played by PMSs on subsidiaries strategic decisions (INFTOT). In addition, the analysis includes three contingency-related variables: GLOBP measures the global pressure perceived by the subsidiary in the competitive

environment; UAI measures the level of tolerance for uncertainty and ambiguity within the headquarters' country; LNSIZE measures the subsidiary's size.

Table 2.7. Focus Group Participants

	Subsidiary Participant								
Variables	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
PERSP	2	3	4	2	3	4	4	2	1
SIZE	1,200	213	3,778	40	270	54	600	500	50
DESIGN	2	2	2	1	1	1	2	1	1
GLOBP	3.50	4.00	4.00	5.00	4.25	3.75	4.75	4.50	4.25
DIFF	2	1	1	3	3	3	3	3	3
LOCPMS	1	1	1	1	1	1	1	1	1
LOCPUR	0	0	1	0	0	1	1	0	0
CENTPUR	0	0	1	0	1	0	0	0	1
HQNAT	USA	France	France	USA	USA	Germany	Finland	USA	USA
UAI	46	86	86	46	46	65	59	46	46
AMM	4	3	3	3	2	1	2	4	1
ANALIT	1	4	1	5	5	5	5	4	5
INAD	3	2	1	5	5	5	4	2	2
INTEG	1	1	1	2	3	2	1	1	1
INFSAL	2.00	1.00	4.00	1.80	2.00	1.00	3.80	2.00	1.20
INFPRD	2.60	1.00	4.60	3.00	3.00	1.00	4.40	2.60	2.20
INFHR	4.00	2.00	5.00	3.40	4.00	1.20	2.60	3.40	3.00
INFTOT	2.87	1.33	4.53	2.73	3.00	1.07	3.60	2.67	2.13
INFSALL	4.00	3.20	2.00	4.40	4.40	4.00	2.40	4.20	2.40
INFPRDL	3.40	2.20	1.40	3.40	1.00	2.20	1.80	4.00	1.40
INFHRL	2.60	3.60	1.00	2.80	4.60	4.80	3.60	4.60	3.00
INFTOTL	3.33	3.00	1.47	3.53	4.18	3.67	2.60	4.27	2.27
CLUST	CP	AM	DC	CP	CP	DL	DC	CP	AM
PART	1	1	1	0	0	0	1	0	0
POSYRS	5	1.5	6	2.5	0.3	2	1	4	4

Table 2.8 reports descriptive statistics. In our final sample, 31 (57%) subsidiaries report performance results measured according to multiple measurement perspectives to headquarters on a regular basis. However, only 9 (17%) use PMSs including all the four measurement perspectives as proposed by the Balanced Scorecard. On average, PMSs consider two measurement perspectives. The vast majority of PMSs are imposed by the headquarters; only 13 (24%) subsidiaries participate in designing performance measures. In most of the cases (85%), subsidiaries use performance measures reported to headquarters to communicate and monitor performance results, rather than to evaluate and reward performance. The high mean value of GLOBP reveals that many subsidiaries face high global pressure in their competitive environment.

Table 2.8. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Dev
PERSP	54	1.00	4.00	2.04	1.12
DESIGN	54	1.00	4.00	1.31	0.64
PART	54	0.00	1.00	0.24	0.43
CENTPUR	54	0.00	1.00	0.15	0.36
GLOBP	54	1.25	5.00	3.82	0.85
UAI	54	23.00	94.00	53.85	17.43
LNSIZE	52	1.10	8.99	5.36	1.54
INFSAL	54	1.00	4.40	2.09	0.96
INFPRD[a]	50	1.00	4.60	2.33	1.05
INFHR[a]	51	1.00	5.00	2.64	1.12
INFTOT	54	1.00	4.53	2.36	0.90
LOCPMS	54	0.00	1.00	0.91	0.29

[a] *Some of the subsidiaries have no authority on specific decisions related to Production, R&D, or Human Resource Management*

Antecedents of PMS's influence on subsidiary's decision making

To address the first research question, this study examines the correlations between the three PMS-related variables, the three contingency-related variables, and the influence of PMSs on subsidiary decision making. Table 2.9 reports Pearson correlations.

Table 2.9. Correlation Matrix

Pearson Coefficients	PERSP	DESIGN	CENTPUR	GLOBP	UAI	INFSAL	INFPRD	INFHR	INFTOT
DESIGN	**.460*** **								
CENTPUR	.033	-.125							
GLOBP	**.241***	.116	.105						
UAI	.049	.155	-.042	.061					
INFSAL	.183	.142	.039	**.292****	**-.272****				
INFPRD	**.287****	.194	.153	**.252***	-.245	**.579*** **			
INFHR	.182	.179	.138	**.366*** **	-.174	**.590*** **	**.520*** **		
INFTOT	.216	.214	.114	**.375*** **	**-.250***	**.859*** **	**.820*** **	**.859*** **	
LNSIZE	.173	.092	**.261***	.091	.062	.186	**.410*** **	**.296****	**.294****

*** *Correlation is significant at the 0.01 level (2-tailed).*
** *Correlation is significant at the 0.05 level (2-tailed).*
* *Correlation is significant at the 0.10 level (2-tailed).*

PERSP is significantly and positively correlated with DESIGN, GLOBP, and INFPRD. This indicates that balanced PMSs (i.e., PERSP > 1) are designed in a participative way; they are employed within subsidiaries facing global competitive pressure; and they are associated with high influence on production and R&D decisions. CENTPUR shows no significant correlations except with LNSIZE, indicating that PMSs are employed with a broader purpose within large subsidiaries. GLOBP is correlated with all four variables capturing the influence played by PMSs on subsidiaries' decision making (i.e., INFSAL, INFPRD, INFHR,

INFTOT). Thus, the competitive environment seems fundamental to understand the decision-influencing use of PMS. In case of high global pressure, performance measures reported to headquarters play a greater role in influencing subsidiaries' decision making. INFTOT is positively correlated with LNSIZE and negatively correlated with UAI. This suggests that the decision-influencing use of PMSs appears to be higher within large subsidiaries and lower in case of headquarters located in high uncertainty avoidance countries.

Table 2.10. Linear Regression Model

$$INFTOT = \beta_0 + \beta_1(PERSP) + \beta_2(PART) + \beta_3(CENTPUR) + \beta_4(UAI) + \beta_5(GLOBP) + \beta_6(LNSIZE) + \varepsilon$$

	Coefficient	p-value
Intercept	0.994	0.144
PERSP	-0.003	0.978
PART	**0.535***	0.070
CENTPUR	0.207	0.534
UAI	**-0.016****	0.013
GLOBP	**0.035*****	0.010
LNSIZE	**0.139***	0.067
Adj. R-Square	28.4%	
F-Statistic	4.367***	
Sig.	0,001	
N	51	

*** *Significant at the 0.01 level (2-tailed).*
** *Significant at the 0.05 level (2-tailed).*
* *Significant at the 0.10 level (2-tailed).*
PERSP: number of measurement perspectives contained in PMS; PART: dummy variable for subsidiary's participation in designing PMS; CENTPUR: PMS's purpose; GLOBP: global pressure; UAI: uncertainty avoidance index; LNSIZE: natural logarithm of number of subsidiary's employees; INFTOT: average influence of PMS on fifteen subsidiary's decisions; N: number of observations.
The existence of multicollinearity among the independent variables was tested in this study using the Variance Inflation Factor (VIF). VIFs of all the variables were below 2, so that all of them were included in the final model. Normality test was performed with the following techniques: Shapiro-Wilk Kolmogorov-Smirnov, Cramer-von Mises, and Anderson-Darling.

Table 2.10 shows the results of the regression analysis where the decision-influencing use of PMSs is modeled as a function of three PMS-related variables (PERSP, PART, CENTPUR) and three contingency-related variables (GLOBP, UAI, LNSIZE). All the variables other than PERSP and CENTPUR are significant. In contrast with the advocates of balanced PMSs, the number of measurement perspectives does not seem to impact the influence of PMS on decision making. Significance of the coefficients on PART, GLOBP, UAI, and LNSIZE suggests that participative design, global competitive pressure, headquarters cultural attributes, and subsidiary's size are significant antecedents of the decision-influencing use of PMSs.

Influence of balanced versus non-balanced PMSs on subsidiary decision making

Results in Table 2.10 indicate that balanced PMSs are significant antecedents of the decision-influencing role of PMS. However, in order to investigate the second research question more deeply, this study analyzes the differences between subsidiaries with balanced PMSs and subsidiaries with non-balanced PMSs. The sample is split into two subsets (see Table 2.11): subsidiaries with balanced PMS (BPMS) *versus* subsidiaries with not-balanced PMS (not-BPMS). Results based on an ANOVA-test comparing mean values reveal that the two subsets show a significantly different mean for DESIGN: specifically, subsidiaries with balanced PMSs report a more participative design of performance measures. Within the sample, global pressure, uncertainty avoidance, and subsidiary size do not help to distinguish between subsidiaries with balanced PMSs and those with non-balanced PMSs. Strategy-related variables are probably more powerful to predict the use of multiple measurement perspectives, as partially shown by Ittner et al. (2003). Mean values for the variables capturing the influence of balanced PMSs on decision making are higher in case of balanced PMSs but the difference is not statistically significant. The empirical evidence leads to a negative answer to the second research question. Overall, results indicate that balancing

PMSs *per se* does not foster the decision-influencing use of PMSs. Results suggest that the design of performance measures is the key element to understand PMS's influence on decision making.

Table 2.11. Balanced-PMS versus not-balanced PMS

	Mean			
	BPMS	**Not-BPMS**	**F-Statistic**	**p-value**
DESIGN	1,48	1,09	**5,528****	0,023
CENTPUR	0,16	0,13	0,960	0,758
GLOBP	3,91	3,69	0,817	0,370
UAI	53,61	54,17	0,013	0,908
INFSAL	2,05	2,13	0,101	0,751
INFPRD	2,51	2,08	2,096	0,154
INFHR	2,77	2,46	0,920	0,342
INFTOT	2,40	2,29	0,162	0,689
LNSIZE	5,52	5,15	0,723	0,399
N	31	23		

*** *Significant at the 0.01 level (2-tailed).*
** *Significant at the 0.05 level (2-tailed).*
* *Significant at the 0.10 level (2-tailed).*
DESIGN: subsidiary's participation in designing PMS; CENTPUR: PMS's purpose; GLOBP: global pressure; UAI: uncertainty avoidance index; LNSIZE: natural logarithm of number of subsidiary's employees; INFTOT: average influence of PMS on fifteen subsidiary's decisions; INFSAL: average influence of PMS on five sale and marketing decisions; INFPRD: average influence of PMS on five production and research decisions; INFHR: average influence of PMS on five human resources decisions; N: number of observations.

Consequences of PMS's influence on subsidiary decision making

Responses to our questionnaire reveal that most of the subsidiaries (90% of the final sample) independently develop and autonomously use their own PMS (hereafter local PMS) different from that implemented by the headquarters (hereafter central PMS). Table 2.12 reports descriptive statistics on the de-coupling of PMSs. DIFF measures how different the two

PMSs are. On average, they differ not only because local PMSs contain additional and different indicators from those reported to the headquarters, but also because they articulate and represent them according to different measurement dimensions. For example, one of the participants at the focus group stated: "Our head office requires revenues data aggregated by market segment. For us, this does not make any sense. We look at the results by customers because this is the critical dimension to evaluate our subsidiary's performance. Moreover, the head office requires us to report a total of revenues including promotional sales. In the aggregation by customer we use at the local level, revenues do not contain promotional sales" (Subsidiary participant H). AMM, ANALIT, INAD, INTEG measure the importance of four different factors in explaining why subsidiaries took the decision to locally develop and use a different PMS from that implemented by headquarters. ANOVA analysis ($F = 40,359$; $p = 0,000$) shows that the need for more analyticity (ANALIT) and the perceived inadequacy of central PMS (INAD) are more important than both the administrative issues (AMM) and the lack of integrated information systems (INTEG) in explaining the development of the local PMS. LOCPUR measures the local PMS's purpose. The comparison between the central PMS's purpose reported in Table 2.8 and the local PMS's purpose reported in Table 2.12 indicates that evaluation and rewarding are mostly based on performance measures contained in the local PMS. Finally, INFSALL, INFPRDL, INFHRL, and INFTOTL measure the influence of the local PMS on subsidiary's decision making. The mean values of these variables are higher than the mean values of the variables measuring the influence of the central PMS on subsidiary decision making (i.e., INFSAL, INFPRD, INFHR, and INFTOT in Table 2.8). This implies that subsidiaries' strategic decisions are mainly driven by locally-developed systems. Imposed PMSs (balanced or not-balanced) do not significantly affect subsidiaries' decision making.

Table 2.12. PMSs de-coupling

	Minimum	Maximum	Mean	Std. Dev.
DIFF	0.00	3.00	2.33	0.95
LOCPUR	0.00	1.00	0.31	0.47
AMM	1.00	5.00	2.26	1.27
ANALIT	1.00	5.00	4.26	1.06
INAD	1.00	5.00	3.62	1.16
INTEG	1.00	5.00	1.93	1.36
INFSALL	1.00	5.00	3.10	1.07
INFPRDL	1.00	5.00	2.81	1.15
INFHRL	1.00	5.00	3.39	1.09
INFTOTL	1.27	5.00	3.15	0.91

I propose a categorization of subsidiaries based on the relative influence played by central and local PMSs in order to discuss the consequences of PMSs' influence on subsidiaries' decision making. Figure 2.2 shows the categorization. To describe the four clusters of subsidiaries, I draw arguments from the information collected through the focus group and from the statistical analysis. Quotations taken from the transcription of the focus group discussion introduce the cluster's description. Table 2.13 reports and compares mean values across clusters.

1.Dominant Central PMS (DC)

> "We got to the point where integration was highly necessary to compete in our business. For the headquarters the myriad of different performance measures throughout the organization was not tolerable anymore. [...] A task force visited all the subsidiaries. The approach was very hierarchical: these and only these are the 15 fundamental measures to manage the business, not only in Italy, but also in Germany, Japan, and in any other country. " (Subsidiary Participant G)

The first cluster contains subsidiaries with high influence of the central PMS and low influence of the local PMS on subsidiary decision making. These subsidiaries report the highest mean value for PERSP. This indicates that dominant central PMSs tend to be pervasive; that is, they measures performances according to multiple measurement perspectives. Moreover, subsidiaries in this cluster tend to use performance measures reported to the headquarters for evaluation and rewarding purposes. On average, the subsidiaries with dominant central PMSs are large companies, facing high global competitive pressure. With respect to the subsidiaries of other clusters, they do not perceive the central PMS as an inadequate representation of their performances and their local PMS does not significantly differ from the central PMS. In this cluster, the decision-influencing use of PMSs contributes to hierarchically-integrated local subsidiaries.

Figure 2.2. Subsidiaries Categorization

This Figure represents the subsidiary categorization based on the decision influencing use of local and central PMSs. The figure reports for each cluster the number of subsidiaries (N) and mean values for the decision influencing use of the central PMS (INFTOT) and for the local PMS (INFTOTL).

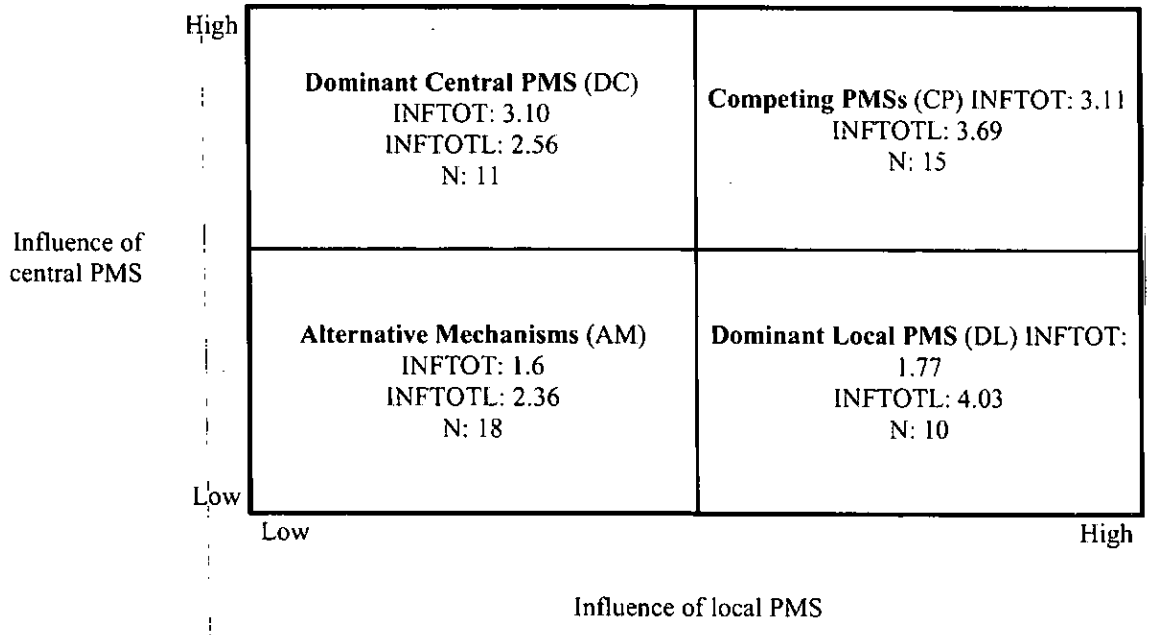


Table 2.13. Clusters

	Mean				F-Statistic	p-value
	DC	AM	DL	CP		
PERSP	2.55	1.56	2.30	2.07	**2.211***	0.098
DESIGN	1.36	1.06	1.60	1.40	1.846	0.151
CENTPUR	0.18	0.11	0.20	0.13	0.166	0.919
GLOBP	4.09	3.37	4.04	4.01	**2.796****	0.50
UAI	52.73	56.56	64.30	45.20	**3.417*****	0.033
LNSIZE	6.33	5.12	4.86	5.30	1.895	0.143
DIFF	2.00	2.40	2.70	2.21	0.955	0.422
LOCPUR	0.44	0.07	0.80	0.13	**9.060*****	0.000
AMM	2.00	1.68	2.20	3.04	**3.543****	0.022
ANALIT	4.00	4.44	4.40	4.15	0.418	0.741
INAD	3.00	3.68	4.00	3.69	1.256	0.301
INTEG	2.00	1.37	2.30	2.20	1.312	0.282
INFTOT	3.10	1.60	1.77	3.11	**33.596*****	0.000
INFTOTAL	2.56	2.36	4.03	3.69	**25.265*****	0.000
N	11	18	10	15		
# of Subsidiary Participants at the focus group	2	2	1	4		

*** *Significant at the 0.01 level (2-tailed).*
** *Significant at the 0.05 level (2-tailed).*
* *Significant at the 0.10 level (2-tailed).*

2.Alternative Mechanisms (AM)

"Oftentimes headquarters try to impose systems, structures, solutions, etc.. It never turns out to be a good thing because subsidiaries do not understand the usefulness of those initiatives. Our headquarters devote a lot of attention on communication throughout the organization. " (Subsidiary Participant I)

Many respondents (33%) report low values for the influence on decision making of both central and local PMSs. This implies that multinational companies adopt alternative mechanisms to integrate, coordinate and control local subsidiaries. Recent international business studies emphasize the role of subtle and socializing mechanisms to manage internal strategic differentiation and organizational complexity of modern multinational companies. Formal top-down administrative systems are considered as less important than mechanisms based on cooperative processes and shared values. On average, PMSs within the subsidiaries of this cluster are not balanced and they are not used as evaluation systems. This cluster has the lowest mean value for global pressure. Consistent with our previous analyses, this indicates that PMSs loose their influence on strategic decision making in case of low global pressure. Low decision-influencing use of PMS suggests that PMSs are one element of a complex set of control mechanisms guiding subsidiaries' management.

3.Dominant Local PMS (DL)

> "The idea of one single global set of leading indicators scares me. Every subsidiary faces a very peculiar local environment and common indicators would rapidly lead to misinterpretations. [...] My subsidiary is independently building its own balanced scorecard." (Subsidiary Participant F)

The third cluster groups subsidiaries with low decision-influencing uses of central PMSs and high decision-influencing uses of local PMSs. These subsidiaries develop local PMSs significantly different from their central PMSs and they use them to evaluate and reward local performances. They consider central PMSs as inadequate to manage their business. On average, their headquarters belong to countries with high uncertainty avoidance. In this cluster, the high value of the decision-influencing use of local PMSs helps subsidiaries to pursue their role and to actively respond to the local environment. On the other hand,

headquarters could experience a lack of control because autonomous local systems drive subsidiary decision making.

4.Competing PMSs (CP)

> "We have unique products and processes which are different from those of all the other subsidiaries. Basically, what we do is substantially different from the core businesses of our multinational group. That's why we need our own local PMS." (Subsidiary Participant D)

Fifteen respondents (28%) report high values for the influence on decision making of both central and local PMSs. This cluster has the lowest mean value of uncertainty avoidance. On average, subsidiaries within this cluster develop local PMSs mainly because of administrative issues. Within these subsidiaries, central and local PMSs compete for influencing subsidiary decision making. In the short run, this situation allows an entrepreneurial subsidiary to develop its strategic role within the group. However, in the long run, the decoupling of PMSs can lead to a strategic misalignment and centrifugal conflicts between head-office and subsidiary management. High values for decision-influencing use of both central and local PMSs generate competition between management systems and hinder strategic alignment. The severity of these threats depends on the reason why subsidiaries develop autonomous local PMSs.

V. CONCLUSIONS

This study discusses the role of balanced PMSs within multinational companies. In particular, the empirical research investigates antecedents and consequences of the decision-influencing use of PMSs. Results based on qualitative and quantitative research methods reveal that subsidiary's participation in designing PMSs is a key element affecting PMSs' influence on decision making. Contingency-related variables are other relevant antecedents of the

decision-influencing use of PMSs. Instead, balancing PMSs *per se* does not appear to lead to more influential PMSs.

The categorization of subsidiaries based on the decision-influencing uses of PMSs indicates that headquarters rely on a broad mix of control mechanisms to govern modern multinational companies. The differentiation of subsidiaries' roles within multinational organizations calls for a new approach towards PMSs both in practice and in research. This study shows that to understand and manage PMSs, it is not sufficient to analyze its content meaning the characteristics of performance measures. Research and practice should devote their efforts to study how these systems are designed, communicated, and implemented within the organization. Furthermore, they need to consider PMSs as management tools strongly affected by the competitive business and company culture. Researchers should operationalize relevant constructs through new variables and new measures capturing a broader set of elements related to PMSs. Practitioners should identify best practices to design PMSs as an integrated element within the management control set of mechanisms. More research on these aspects could enhance our knowledge and overcome the limitations of this study.

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Incentive Paper

Incentive systems and individual performance: the mediating effect of human behavior and the moderating effect of model of man

I. INTRODUCTION

This paper contributes to advance our knowledge on the link between incentive systems and individual performance. Our knowledge is far from complete mainly due to four reasons. First, most of prior studies addressed the topic looking at macro-organizational variables (e.g., strategy; performance evaluative style, organizational interdependency, pay-for-performance sensitivity). As a consequence, these studies did not consider the linkages between incentives and human behavior, and between human behavior and individual performance. Second, recent incentives-related research shed light on both antecedents of some incentive systems characteristics (e.g., Gibbs et al., 2004; Ittner and Larcker, 2002) and their effect of on superior's evaluation attitudes (Moers, 2005; Ittner et al., 2003; Lipe and Salterio, 2000), but there is a lack of literature - especially within the accounting literature - showing how incentive features affect subordinate's behavior. Third, the extant literature is constrained by "single-paradigm-induced blinders" (Merchant et al. 2003, p. 251). In particular, most of accounting research in this field applies economics-based theories, namely agency theory. Fourth, a common conclusion in prior literature review papers is that the empirical findings on the role played by incentives on individual performance are mixed and conflicting (Merchant et al., 2003; Bonner and Sprinkle, 2002; Bonner et al., 2000). One of the plausible reasons is due to the lack of studies examining important mediating and moderating variables.

This study examines mediators related to human behavior intervening in the incentive-performance relationship. I focus on the effect of two incentive system elements, namely: measurement diversity and subjectivity. I analyze how individuals react to these elements through the study of organizational stress and self-regulatory behavior in order to explain

variance in individual performance. Based on the theory of role dynamics (Kahn et al. 1964), I argue that measurement diversity and subjectivity lead to organizational stress through role conflict and role ambiguity. Based on the theory of feedback seeking behavior, I argue that subjectivity leads to self-regulatory behavior.

Furthermore, this study examines the moderating effect of individual attributes on the incentive-performance relationship. Two different models of man derived from two different theories are considered: agents and stewards. According to economics-based agency theory, interests of the superior (principal) and of the subordinate (agent) diverge. Incentives are employed to reduce agency costs of monitoring and control. Alternative theoretical models of man referring to other disciplines frame the superior-subordinate relationship. According to the behavioral (psychology- and sociology-oriented) stewardship theory, interests of superior (principal) and of subordinate (steward) are aligned (Donaldson and Davis, 1991). Incentives are employed to sustain the relationship through empowerment and socialization mechanisms. This paper does not intend to validate these two seemingly competing theories. Rather, consistent with the ambivalence concept in the psychology literature, any individual is expected to combine characteristics of both agent and steward. Likewise, even the authors of stewardship theory believe that superiors may have agency-type relationships with some subordinates and stewardship-type relationships with others (Davis et al., 1997). The research purpose is to test whether or not a certain model of man moderates the impact of incentive systems characteristics on human behavior.

The research site of this study is the Italian subsidiary of Nokia - a Finnish telecommunication company - with all its employees included in a short-term incentive plan. By collecting data from one company, I am able to isolate individual aspects from all macro-organizational variables whose influence on incentive-performance relationship has been widely discussed in prior work. Moreover, the relatively large number of individuals included

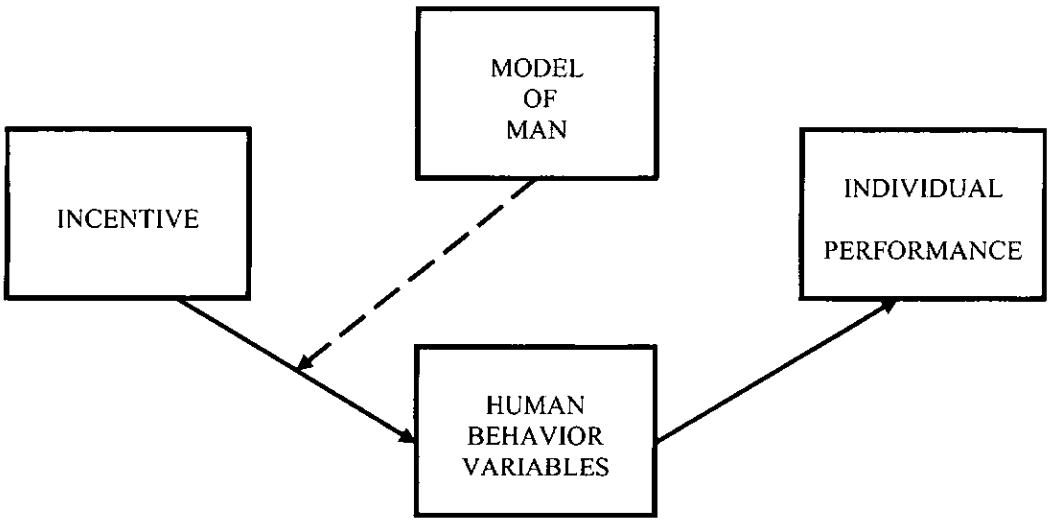
in the incentive plan allows me to run quantitative analyses which corroborate qualitative data collected through field work. Nokia's short-term incentive plan (hereafter called STIP) is formula-based. The formula weighs individual performance with the sum of team-based and company-based multipliers. Individual performance is measured through quantitative and qualitative indicators, financial and non-financial measures, and according to multiple balanced perspectives. The size of annual reward varies from 1.75% to 45% of annual salary depending on job-grade. Cash bonuses are determined and paid every semester.

Empirical results provide support for the hypotheses on the mediating effect of human behavior variables. Specifically, measurement diversity in incentive-related targets tends to cause role conflict with a negative effect on performance. Evidence on the moderating role of model of man on these relationships offers partial support for the predictions.

Results reveal the importance of human behavior variables for understanding the link between incentive systems and individual performance. This research is one of the first attempts to empirically implement the conceptual framework developed by Bonner and Sprinkle (2002) to test mediators and moderators in incentive-performance relationships (Figure 3.1). The paper overcomes some of the constraints identified by Merchant et al. (2003) on the advancement of knowledge in incentives-related research. I did not adopt one single view of the world. One specific variable for model of man is included in the analysis in order to grasp the effect of personal attributes. To do that, I relied on several different disciplines. As such, this study shows the benefits of a multi-disciplinary approach to performance measurement and incentive systems research.

The following section presents the theoretical underpinnings of the study and develops the hypotheses. Section 3 describes the research site and Section 4 explains the research method. I then present and discuss the empirical results in section 5. Conclusions, implications, and suggestions for future research are in the final section.

Figure 3.1. Conceptual framework for the effect of incentive on individual performance.



II. HYPOTHESES

Incentive systems and individual performance

The accounting literature provides comprehensive reviews on studies examining the relation between incentives and performance (e.g., Bonner and Sprinkle, 2002). Many different theories have been used to explain why incentives are expected to increase individual performance. For example, expectancy theory by Vroom (1964) posits that incentives lead to higher individual performance through the increase in the expectancy about the effort-outcome relationship and in the valence of the outcome. However, alternative theories predict a negative effect of incentives on performance. For example, cognitive evaluation theory by Deci and Ryan (1985) posits that incentives lead to lower individual performance through the decrease of intrinsic motivation caused by the focus on external rewards. Many prior accounting research studies have empirically examined how incentives affect performance, providing conflicting results (for a review on laboratory studies, see Bonner et al., 2000).

My objective is to show that incentives have an effect on performance through the mediating effect of human behavioral responses to incentives and that personal attributes have a moderating effect on the human behavioral responses to incentives (Figure 3.1). The focus is on quota (specifically, formula-based) incentive schemes which seem to have the strongest effect on performance, or evidence thereof, according to the review by Bonner et al. (2000). Incentive schemes are designed to provide performance-dependent rewards in order to motivate individual behavior (Merchant and Van der Stede, 2003). In formula-based incentives, rewards are tied to performance by formula. This paper focuses on human responses to two elements of the formula: (i) diversity of performance measures on evaluating individual performance and (ii) subjectivity in performance assessment.

Measurement diversity

Incentive systems provide rewards on the basis of one or multiple performance measurement perspectives. In formula-based incentive schemes, formulas vary in measurement diversity: they can be based on measures according to one single perspective (e.g., financial results) or they can balance different perspectives (e.g., customer, internal process, and learning and innovation according to the balanced scorecard approach of Kaplan and Norton, 1992). Advocates of measurement diversity in performance measurement systems contend that a multidimensional approach capture the value drivers of strategy more appropriately and orient individual behavior more effectively (e.g., Kaplan and Norton, 2001). A multidimensional approach implies the adoption of non-financial indicators in addition to traditional accounting measures based on financial perspective. Many authors explain the benefits of non-financial indicators by showing the limitations in financial measures (e.g., Johnson and Kaplan, 1987; Behn and Riley, 1999; Stewart, 1997; Kaplan and Atkinson, 1998; Rees and Sutcliffe, 1994).

Notwithstanding the large amount of arguments explaining the diffusion of the measurement diversity approach, we do not know whether measurement diversity is associated with higher performance. Studies investigating the effect of measurement diversity in incentive systems on performance used different methods and defined measurement diversity and performance differently. Among others, Scott and Tiessen (1999) find a positive effect of measurement diversity on team performance in a study based on a survey sent to both for-profit and not-for-profit organizations. They constructed a categorical variable for measurement diversity with 0, 1, and 2 as possible values. The time-series analysis by Banker et al. (2000) shows that the incentive plan of one hospitality firm including financial and non-financial measures led to improved financial and non-financial performance. As measurement diversity, the authors merely considered whether incentive plans contain customer satisfaction-related measures in addition to the financial indicators. Based on a content analysis of proxy statements disclosed by US companies, Said et al. (2003) report that companies adopting a diverse measurement perspective in compensation schemes obtain higher returns on assets and higher market returns with respect to companies using financial measures alone, on average. The authors measured measurement diversity using a dummy variable. A similar measure is used in the content analysis of proxy statements by Matejka et al. (2005) who provide evidence that loss-making firms are more likely to use non-financial measures in bonus plan than profitable firms. Based on prior studies, it is not possible to conclude that measurement diversity positively impacts individual performance.

Yet, the accounting literature provides evidence of dysfunctionalites caused by measurement diversity in incentive systems. Based on an experimental study, Lipe and Salterio (2000) conclude that when balanced performance measurements include both unique and common measures across business units, only common measures affect superiors' evaluations. Based

on field studies, Ittner et al. (2003) and Moers (2005) describe several evaluation biases associated with the balancing of diverse measurement dimensions.

No prior study has observed the effect of measurement diversity on subordinate's behavior. My study argues that measurement diversity affects individual performance through the mediating effect of subordinate's human behavior.

Subjectivity

Incentive systems allocate rewards based on the evaluation of individual performance. Objective performance evaluation is based on quantitative assessment of target achievement; whereas subjective performance evaluation is based on superior's subjective judgment of the subordinate's performance. Subjectivity in incentive systems refers to several measurement aspects (for a discussion see Gibbs et al. 2004). I refer neither to subjective rewards allocation nor to subjective performance measures weights. Yet, I refer to the superior's discretion in assessing performance target achievement; in the research setting studied by this paper the subjective target achievement measure is one element of the incentive formula to allocate rewards.

Gibbs et al. (2004) argue that subjectivity is mainly adopted to mitigate distortions or reduce risks connected with formula bonuses and the objective (typically accounting) measures they are based on. Specifically, the authors report empirical evidence suggesting that subjectivity is associated with long-term investment in intangibles, the extent of organizational interdependencies, and incentive recalibration practices. Their research also shows that subjectivity positively affects pay satisfaction, productivity, and profitability only if the level of trust between subordinate and superior is high. However, results on the effects of subjectivity are different across the departments involved in the analysis.

Notwithstanding the plausible benefits of subjectivity, several accounting researchers argue that subjective performance evaluations cause important dysfunctional behaviors. For

example, studies examining the reliance on accounting performance measures in superior evaluative style discuss how the non-accounting performance evaluative style based on subjective judgments increases level of stress and anxiety perceived by subordinates (e.g., Hopwood, 1972; Otley, 1978; Ross, 1994; Otley and Pollanen, 2000). Based on a field-study of the balance of performance measures, Ittner et al. (2003) show that subjectivity is related to several distortions in performance evaluations. In particular, the authors find that superiors tend to ignore relevant non-financial performance measure and to consider external non-performance related factors other than performance measures. In addition, Moers (2005) reports findings on the positive relation between subjectivity and performance evaluation bias: his empirical results support the hypothesis that subjectivity in performance evaluation leads to more lenient and compressed performance ratings.

My study extends the empirical evidence on the behavioral dysfunctionalities caused by subjective evaluation by examining the effect of subjective performance evaluation on subordinate's behavior.

The mediating behavioral responses to incentive systems

The objective of the first set of hypotheses is to test the mediating effect of subordinate's behavioral responses to the two incentive system characteristics presented above within the relationship between incentive and individual performance. My arguments for mediator-related hypothesis development are rooted in industrial-organizational psychology and cybernetics.

Industrial-organizational psychology emphasizes the behavioral dysfunctionalities caused by performance evaluation. I focus on one specific dysfunctionality that is organizational stress operationalized as role conflict and role clarity, according to the theory of role dynamic by Kahn et al. (1964). This theory posits that organizational stress negatively affects individual performance.

Cybernetics emphasizes the link between exogenous and endogenous control mechanisms: exogenous control mechanisms, such as incentive systems, can potentially induce endogenous control mechanisms, such as self-regulatory behavior (Ashby, 1956). I focus on one specific self-regulatory behavior that is feedback-seeking behavior defined as the "conscious devotion of effort toward determining the correctness and adequacy of behavior for attaining values and state", according to the pioneering work by Ashford and Cummings (1983). The theory posits that feedback-seeking behavior positively affects individual performance.

Role dynamics theory-based hypotheses

According to the psychology-based theory of role dynamics by Kahn et al. (1964), individuals within an organization perform a set of activities which are defined as *potential behaviors*. These potential behaviors represent the role associated to any member of the organization. The individual role is subject to several *role expectations* developed by organizational members interested in the role performance. Expectations are communicated through different *role pressures*. Performance measures send pressures to the individuals: they serve to monitor and influence individual behaviors. According to Kahn et al. (1964), role conflict and clarity are the main two factors shaping the role dynamic. Role conflict arises whenever two (or more) sets of pressures are simultaneously exercised and the compliance with one inhibits compliance with the other. Through incentive systems, superiors send motivational pressures to subordinates, linking their individual performance to their rewards. Role clarity refers to the degree to which required information is available, clear, and consistent in any given role. Through incentive systems, superiors guide subordinates' behaviors, sending information about the responsibilities associated to a given role and the best way to perform a given role. Both role conflict and role ambiguity (i.e., the reflected construct of role ambiguity) generate stress and anxiety which decrease individual

performance. Empirical research shows that role conflict and clarity are not mirror images (Rizzo et al., 1970): they are correlated, yet distinct constructs as explained by their respective definitions.

The measurement diversity approach to performance evaluation is presumed to balance different perspectives using multiple measures. Advocates of this approach contend that focus on one single measure generates negative effects eroding overall performance. Strategic goals are achieved only if the financial-, customer-, internal-, learning and innovation-related measures all show positive results. Measurement diversity is expected to solve the trade-off between different measures by balancing financial and non-financial performance. However, according to the theory of role dynamics, these measures are simultaneous pressures on role behavior. These pressures force subordinates to allocate their attention towards different performance dimensions. Therefore, I hypothesize that measurement diversity in incentive systems leads to individual role conflict.

H1a. More diverse set of measures in incentive system design will be positively associated with the level of role conflict experienced by the subordinate.

In order to meet role performance targets, subordinates need information to conform to the role expectations of the organizational members: they must know what activities they are supposed to carry out and how these activities can be best performed. Measurement diversity in incentive plans requires subordinates to orient their behaviors to meet two (or more) targets measured according to different perspectives. As a consequence, subordinates with a diverse set of performance targets need multiple sorts of means-ends knowledge. Information needed to meet a performance target set by a given measure is different from the information needed to meet another performance target set by an alternative measure: for example, to meet a customer satisfaction target the subordinate might need market-related information, whereas to meet a competence development target might need problem-solving knowledge. Therefore,

I hypothesize that measurement diversity in incentive system decreases individual role clarity.

H1b. More diverse set of measures in incentive system design will be negatively associated with the level of role clarity experienced by the subordinate.

In case of subjective performance evaluations, superiors base their performance assessments on judgments on non-objectively-measurable results, for example on quality of output or attitude to job. In this case subordinates do not possess clear and precise ex-ante information about the role expectations. Therefore, they are more likely to experience role conflict and less clarity. Moreover, they are likely to experience anxiety and stress because of the expected performance evaluation bias affecting superiors' discretion. According to role dynamics theory, the concepts of role conflict and clarity capture the level of anxiety and stress experienced by subordinates because of lack of uncertainty about role.

H2a. The use of subjectivity in performance evaluation will be positively associated with the level of role conflict experienced by the subordinate.

H2b. The use of subjectivity in performance evaluation will be negatively associated with the level of role clarity experienced by the subordinate.

For completeness, I replicate the main hypothesis discussed by the theory of role dynamics that is the negative effect of organizational stress on individual performance.

H3a. The level of role conflict experienced by the subordinate will be negatively associated with individual performance.

H3b. The level of role clarity experienced by the subordinate will be positively associated with individual performance.

Feedback-seeking behavior theory-based hypotheses

According to the cybernetics-based feedback-seeking behavior theory by Ashford and Cummings (1983), individuals seek performance-oriented feedback (i) to increase the

accuracy of signals regarding goal prioritization, (ii) to reduce the uncertainty regarding goal attainment issues, and (iii) to obtain a basis for their own competence development. Feedback-seeking behavior can follow two different strategies: feedback-seeking *through monitoring* increases the amount of information by observing the situation and the behaviors of other actors; feedback-seeking *through inquiry* increases the amount of information by directly asking actors in the organizational environment for their perception and/or evaluation. These two strategies are not mutually exclusive and both of them positively affect individual performance. According to theory, feedback-seeking is an endogenous self-regulatory behavior reinforcing the effectiveness of exogenous control mechanisms, such as performance measurement systems. Ashford and Tsui (1991) point out that feedback-seeking behavior improves performance because it guides individuals towards the actions linked with best performance.

Feedback-seeking behavior-related empirical research provides partial evidence on the determinants of this type of self-regulatory behavior (e.g., Ashford, 1986; Ashford and Tsui, 1991; Gupta et al. 1999). The theory considers feedback-seeking as a valuable resource for the individual. In a specific situation, individuals compare benefits and costs associated with feedback-seeking behavior. Therefore, economic determinants, such as the economic rewards, seem to play a fundamental role in explaining the engagement in self-regulatory behavior.

Subjectivity allows superiors to base performance evaluation on their subjective judgment. The discretion contained in subjective performance evaluations increases the uncertainty experienced by subordinates with regard to the criteria adopted to assess performance (e.g., Ross, 1994). I predict that subordinates engage in feedback-seeking behavior to reduce the uncertainty related to subjective performance evaluation. In particular, my hypothesis is that, in case of high weight placed by incentive systems on subjective assessments, subordinates

are more likely to seek behavior through inquiry because this strategy is associated with less inference cost, i.e., cost incurred in interpreting information (Ashford and Cummings, 1983).

H4. The use of subjectivity in performance evaluation will be positively associated with the level of feedback-seeking behavior through inquiry engaged by the subordinate.

For completeness, I replicate the main hypothesis discussed by the theory of feedback-seeking behavior that is the positive effect of self-regulatory behavior on individual performance.

H5. The level of feedback-seeking behavior engaged in by the subordinate will be positively associated with individual performance.

The moderating effect of model-of-man on incentive-behavior relationship

The objective of the second set of hypotheses is to test the moderating effect of model-of man on the link between incentive system characteristics and behavioral responses presented in the previous subsection. Model of man is a broad concept referring to personal attributes an individual possesses. Accounting research does not provide consistent evidence on the moderating role of personal attributes in the relationship between performance measurement systems and behavioral responses. For example, Seiler and Bartlett (1982) find that personality influences the individual's attitude toward the performance measurement system adopted by the organization. Harrison (1993) reports opposite results showing that personal attributes have no intervening effect in the relationship between performance measurement systems and related behavioral responses.

Literature on incentive systems is focused on one single view of the world where the model of man is mostly borrowed from economics. Merchant et al. (2003) suggest that most of incentives-related research considers the man as a rational actor driven by self-serving

behavior. The authors suggest that this single paradigm approach has hindered the progress in accounting research, for example, by ignoring competing theories.

In the management literature, Davis et al. (1997) present an alternative model of man based on the stewardship theory rooted in psychology and sociology. Stewards seek preferably the achievement of organizational success. They do not act opportunistically. Yet, they cooperate through an organization-centered and collectivistic behavior. Agents differ from stewards on psychological and situational factors. Motivation, organizational commitment, and power are the three psychological factors proposed by Davis et al. (1997) to distinguish agents from stewards. The situational factors are management philosophy and cultural differences. My research is able to hold situational factors constant because it is based on empirical evidence observed in one single company. In order to test the moderating effect of model of man on the relationship between incentives and behavioral responses, I focus on organizational commitment to capture personal attributes of the subordinate. I do so for three reasons. First, organizational commitment has been widely discussed in the management literature with regards to its theoretical aspects (e.g., Buchanan, 1974; Reichers, 1985; Bar-Hayim and Berman, 1992). Second, empirical research provides robust instruments to measure it (Porter et al., 1974; Schecter, 1985; Mayer and Schoorman, 1992). Third, in studying the impact of incentive systems on human behavior and performance, I believe it is important to observe how and to what extent individuals are committed to perform.

Organizational commitment is a multi-component concept embracing identification, involvement, and loyalty to an organization (Porter et al., 1974). In particular, based on the results obtained by Schechter (1985), Mayer and Schoorman (1992) defined value commitment as "a belief in, and an acceptance of, organizational goals and values and a willingness to exert considerable effort on behalf of the organization" (p. 673). They distinguish it from the continuance commitment concept defined as "the desire to remain a

member of the organization" (p. 673). Davis et al. (1997) argue that agent-oriented (steward-oriented) subordinates are more likely associated with low (high) value commitment. My main hypothesis is that the model of man, agent-oriented *versus* steward oriented, moderates the behavioral responses to incentive systems characteristics. This is consistent with both role dynamics and feedback-seeking theory. Kahn et al. (1964) point out that individuals respond to any organizational element through the representation of it, which is drawn from his psychological environment. In the feedback-seeking behavior framework by Ashford and Cummings (1983), cognitive factors are supposed to affect the extent of actual self-regulatory behavior engaged by individuals by mitigating or exacerbating the perception of the costs and benefits. I adopt value commitment as the personal attribute discriminating agent-oriented and steward-oriented subordinates.

H1a predicts that a diverse set of measures creates role conflict because of trade-offs exist between different performance measurement perspectives. For steward-oriented subordinates, measurement diversity can be a mechanism to share with superiors what the performance drivers represent and how they are interconnected. Therefore, I hypothesize that high value commitment mitigates the positive effect of measurement diversity on role conflict because the multiple measurement perspectives approach sustains the cooperative attitude of steward-oriented subordinates.

H6a. Subordinates with higher (lower) value commitment experience lower (higher) role conflict in response to the measurement diversity in incentive system design.

H1b predicts that a diverse set of measures creates role ambiguity because of the wide and inconsistent spectrum of information subordinates are supposed to handle to perform their role. For steward-oriented subordinates, measurement diversity can be a mechanism to better understand strategic priorities of the organization. Therefore, I hypothesize that high value

commitment mitigates the negative effect of measurement diversity on role clarity because multiple measurement perspectives approach sustains the pro-organizational attitude of steward-oriented subordinates.

H6b. Subordinates with higher (lower) value commitment experience higher (lower) role clarity in response to the measures diversity in incentive system.

H2a and H2b predict that subjective performance evaluations create role conflict and ambiguity, respectively, because of the lack of clarity about role expectations. For steward-oriented subordinates, the relationship with superiors is based on goal congruence and trust. Therefore, I hypothesize that high value commitment mitigates the effect of subjectivity on role conflict clarity because trust between the steward-oriented subordinates and their superiors reduces the negative effect of lack of clarity about performance evaluation.

H7a. Subordinates with higher (lower) value commitment experience higher (lower) role clarity in response to subjective performance evaluations.

H7b. Subordinates with higher (lower) value commitment experience lower (higher) role conflict in response to subjective performance evaluations.

H4 predicts that subjective performance evaluation creates feedback-seeking behavior through inquiry because of the need to reduce uncertainty about performance evaluation criteria. For steward-oriented subordinates, dialogue and communication are key organizational mechanism to produce cooperation. Therefore, I hypothesize that high value commitment reinforces the positive effect of subjectivity on feedback-seeking behavior through inquiry because to some extent cooperation reduces the costs incurred in obtaining relevant performance information.

H8. Subordinates with higher (lower) value commitment engage to a higher (lower) extent in feedback-seeking behavior through inquiry in response to subjectivity in performance evaluations.

III. RESEARCH SITE[16]

The research site of this study is the Italian subsidiary of Nokia Corporation, the world leader in mobile communications. This study focuses on the incentive system implemented by Nokia in all its local subsidiaries. By collecting data from one organization, I isolate individual aspects from all macro-organizational variables whose influence on the incentive-performance relationship has been widely discussed in prior works (e.g., Chow et al., 1999; Collins et al., 1997; Ittner and Larcker, 1995). I gained access to this company through the Italian Country Controller who had been in Nokia for 10 years; he worked two years at the Finnish head office and has been in his current position for 4 years.[17] His experience and cooperation improved both the access to proprietary information and the analysis of empirical findings.[18] Initial contacts with him happened at an academic workshop about a previous research project involving respondents to a survey conducted on multinational companies.[19] The type of contact indicates no sponsorship bias (Atkinson and Shaffir, 1998). Nokia is an interesting research setting because of the firm's competitive success and its reliance on multidimensional performance measurement.[20] Further, the relative large size of the Italian subsidiary (about 460 employees) allows quantitative analyses that corroborate qualitative data collected through field work. The remainder of this section is organized in three parts. First, it overviews the main elements of Nokia's corporate strategy, structure, and performance. Second, it describes Nokia's performance measurement system. Finally, it provides detailed information about the individual performance-based incentive system.

[16] This section largely draws on a case study written by Dossi and Patelli (2005) which provides additional details on the research site.

[17] At the time of the research, he was also Regional Controller of two geographical areas, namely South Europe and North Africa.

[18] Purpose of the study, data collection instruments, empirical results, and preliminary conclusions were shared and discussed with him. Moreover, he was an external member of my PhD Thesis Committee.

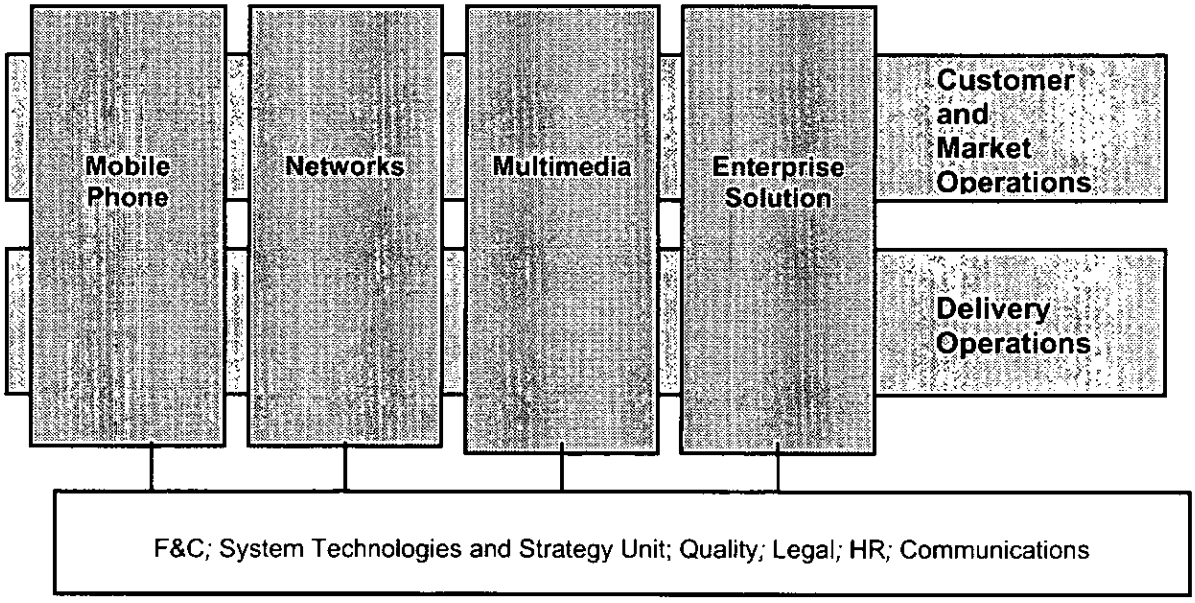
[19] For further details on the research purposes of this previous work, see the second paper of my dissertation.

[20] Nokia's stock rose 34.000% between 1992 and the end of 2000; in 2001 and 2002, when the telecom industry imploded, Nokia earned a combined $5.2 billion; in 2004, Nokia's market share in worldwide mobile phone shipments is about 30% and even if its recent trend is negative, Nokia's market share is still far above the 15% of Motorola, its main competitor in mobile phone industry. For details on Nokia's reliance on multidimensional performance measurement, see next sections.

Overview of the research site

The roots of Nokia go back to 1865 in Finland with a company operating in the forestry industry. Through different mergers and acquisitions, Nokia became one of the largest European multinational companies.[21] Since the beginning of the 1900s, it has concentrated its activities on the telecommunication business by divesting its basic industry operation. Today, Nokia is a world leader in mobile communications, providing equipment, solutions, and services for networks operators. With nearly $40 billion in sales, 55.000 employees, and its stock listed on four exchange markets, Nokia is one of the world's largest companies,[22] operating in 44 countries.[23]

Figure 3.2. Nokia's organizational structure



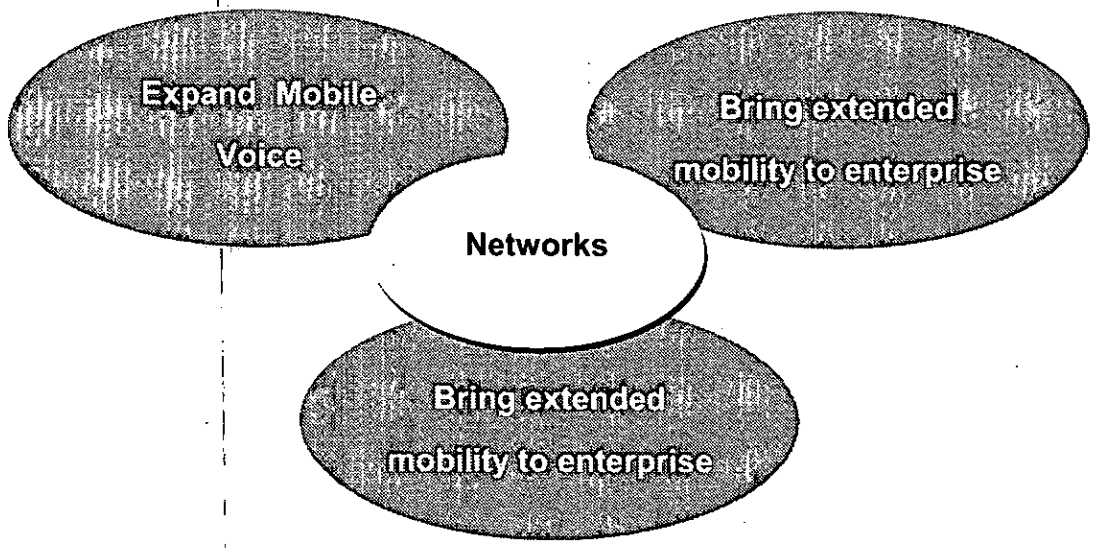
[21] Nokia accounts for 3,7% of Finland's GDP, 18% of its export, and 20% of the government's corporate tax receipts (data disclosed by the Research Institute of the Finish Economy and reported in Fortune, January 24, 2005).

[22] In 2005, Forbes 2000 ranks Nokia as the world's 105th leading company (Forbes, April 18, 2005). Forbes 2000 is a composite ranking considering not only sales, but also profits, assets and market values. In 2005, Nokia reports 39.711 in sales, 4.351 in profits, 29.913 in Assets, and 73.136 in market value (values in millions of dollars).

[23] In terms of sales, US is the most important national market, accounting for about 11% of Nokia's net sales. Italy is the 9th, accounting for 3%.

Nokia's organizational structure includes four business groups: Mobile Phones (manufacturer of mobile phones and devices based on various global cellular technologies); Multimedia (operator in the growing mobile multimedia market with advanced mobile devices and solutions); Enterprise Solutions (provider of business-optimized mobile devices, like mobile email and Internet, virtual private networks, and firewalls, designed to help companies mobilize their workforces while ensuring the security and reliability of their networks); Networks (leading provider of network infrastructure, communications and networks service platforms and services to operators and service providers). It also includes two horizontal groups that support the mobile device business groups: Customer and Market Operations and Technology Platforms. Figure 3.2 reports Nokia's organizational structure.

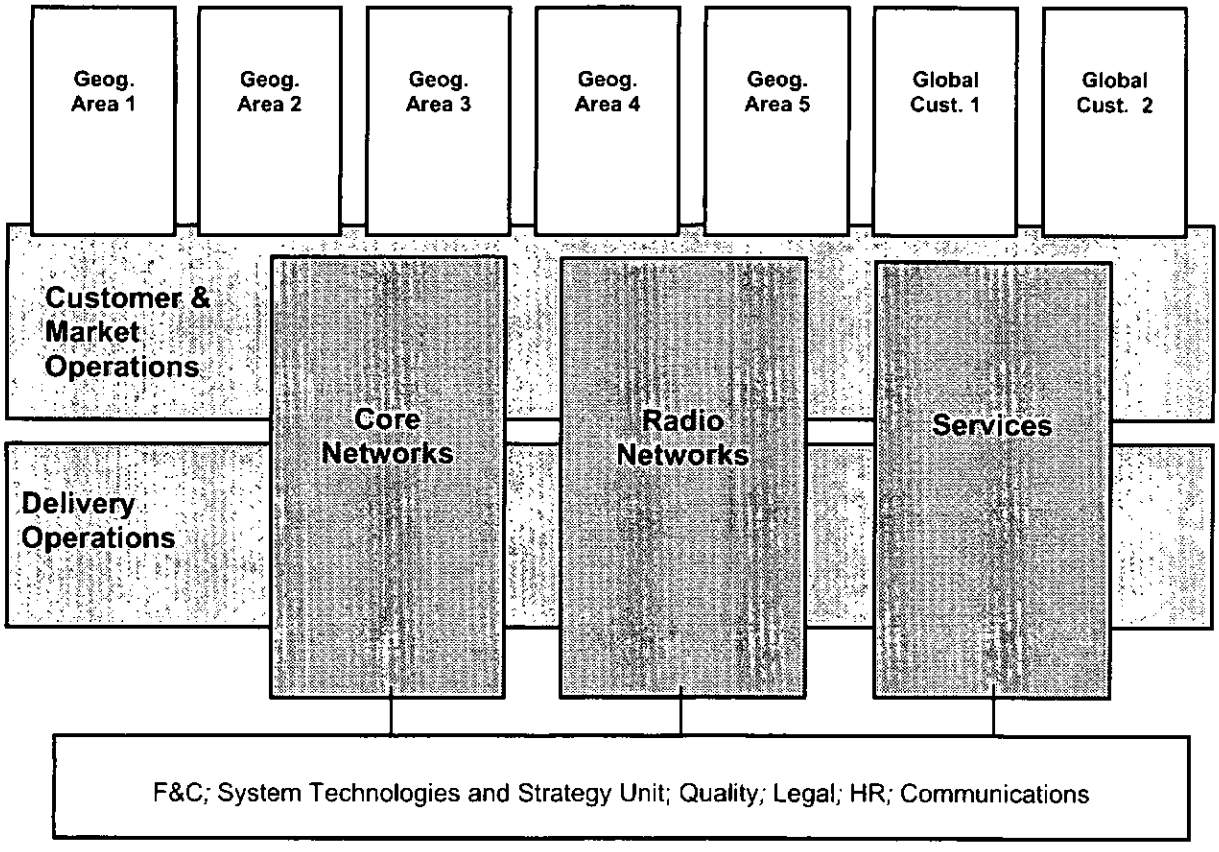
Figure 3.3. Nokia's business strategy.



This study is limited to the Networks business group (hereafter called NET). Even if Nokia is well known in the world for its modern, reliable and advanced mobile phones offered by the Mobile Phone business group, NET is a key element within Nokia's business model. NET is the largest business group, employing 30% of the Nokia's workforce and it accounts for 22%

of Nokia's net sales. Nokia places NET at the center of its strategy (see Figure 3.3). To expand mobile communications in terms of volume and value, Nokia focuses on three strategic activities: (i) expanding mobile voice; (ii) driving consumer multimedia; (iii) bringing extended mobility to enterprises. NET enables mobility for mobile voice, consumer multimedia and enterprise solutions, providing the infrastructures and the services needed to sustain these strategic expansions.[24]

Figure 3.4. Nokia Network's organizational structure



NET's organizational structure is a complex matrix, with three business units (Core Networks, Radio Networks, and Services), two horizontal groups (Customer and Market Operations and Delivery Operations), seven customer business teams (five geographical areas and two global customers), and some NET-wide functions (see Figure 3.4). This

[24] In Nokia's strategic mission reports, NET is defined as "the world's leading enabler of mobility".

organizational complexity reflects the complexity in the competitive environment that is characterized by high capital investments, long project execution times, diverse technologies, different national regulations, and varied customer needs. As discussed in the next section, the organizational and market complexity is one of the factors explaining the adoption of an integrated performance measurement system such as the balanced scorecard.

I conducted my research in Nokia Italy, a subsidiary established in 1990. Initially devoted to mobile phone marketing, Nokia Italy opened the NET business group in 1994. In 2004, 72% of the subsidiary's employees worked for NET; subsidiary's net sales were 884 million of Euro. Nokia Italy is the fourth European subsidiary by net sales.[25] It has offices in five cities and has about 460 employees.

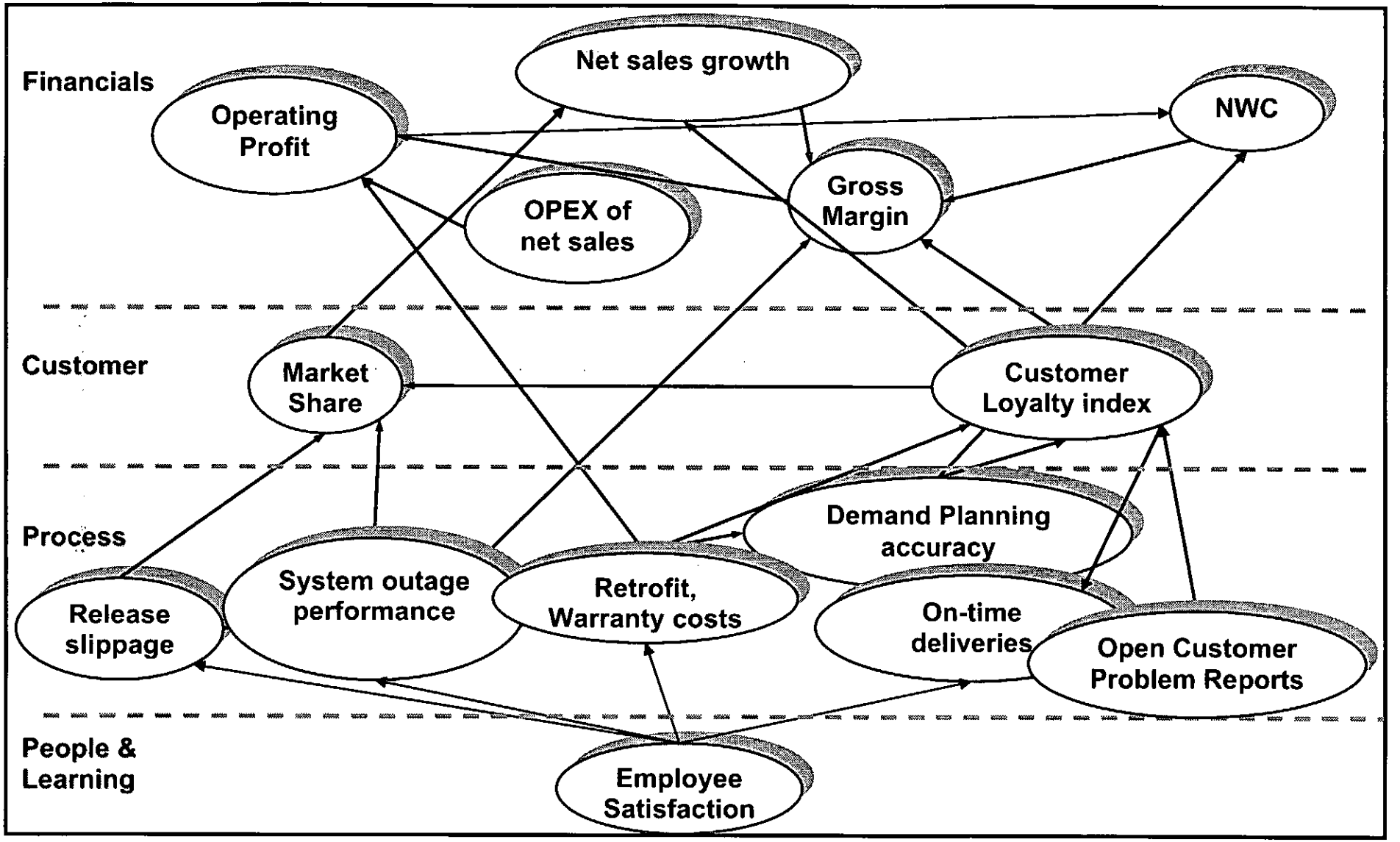
Performance measurement system[26]

In the early 1990s, Nokia's business was driven by emerging technologies, non-regulated competition, and rapid growing demand. Headquarters responded to this dynamic environment by delegating decision-making authority to the subsidiaries and by adopting loose control mechanisms, based on a variety of differentiated management systems. At that time, there was no system of performance measurement, according to the Italian Country Controller. Information was collected in an unstructured way on a myriad of performance measures at various levels of the organization and at various frequencies throughout the year. Eight different information systems were used to extract performance results. No precise administrative policies guided performance measurement and evaluation. No performance-based incentive system was in place. Notwithstanding this performance measurement chaos, Nokia stabilized its competitive leadership in the market and generated high accounting profits and stock returns as well.

[25] By net sales, the European market is the largest one, accounting for 55% of Nokia's net sales; UK, Germany and Russia are the top three European subsidiaries.

[26] This sub-section largely draws on company's internal documents analysis mainly including presentations slides on NET's performance measurement system, and administrative and strategic manuals. With regard to these documents, I omit the quotations and their specific sources, for reasons of brevity.

Figura 3.5. Nokia Networks Balanced Scorecard (NET-BSC).



In the late 1990's, the market conditions stabilize: every nation started issuing specific regulations; demand growth slowed down; technologies stabilized. As a consequence, Nokia's headquarters began a centralization process to rationalize economic resources and to standardize management practices throughout the multinational organization. Specifically, three main initiatives impacted performance measurement and evaluation through the change in organizational conditions.[27] First, the organizational structure was redesigned: the new structure eliminated the country dimension, allocating responsibilities to three business units, and identified clusters of customers, centralizing the management of customer-oriented processes. Second, headquarters replaced all local information systems with one worldwide enterprise resource planning solution. Third, a task force of financial controllers designed and implemented a new performance measurement system:[28] the Balanced Scorecard of Nokia Networks (hereafter called BSC-NET) reported in Figure 3.5.

Nokia explicitly declared the strategic intent justifying the BSC-NET implementation: its objective is to provide relevant and precise facts for NET management for decision making. The performance measures included in BSC-NET are intended to provide a systematic approach for identifying, collecting and sharing holistic, yet focused strategic performance information (financial and non-financial) and for setting and communicating aligned targets, derived from the critical success factors and strategic objectives, in order to enable continuous improvement and learning. Three main criteria guided BSC-Net design. First, Nokia requires its performance measurement to be focused. Thus, BSC-NET includes a selected number of measures to describe, follow and drive the business. Second, performance

[27] This dissertation is not an organization study and this paper does not deal with organizational change. The focus here is on performance measurement, evaluation and incentive. Therefore, this paper does not claim to explain the change in Nokia's organization in the late 1990s. However, it does recognize that a relevant change happened at that time and it give some insights, merely on its impact in shaping the performance measurement system.

[28] The approach was fully hierarchical. The task force coming from the headquarters visited all the 55 subsidiaries operating at that time and implemented the new system in six months. The first version implemented in 2000 contained about 30 performance measures, in some cases calculated according to different formulas from those currently used. Yet, in 2001 the balanced scorecard was identical to the one in place today.

measures have to be internally consistent. Thus, indicators tend to reflect the company's strategy, avoiding conflicting strategic objectives. Finally, Nokia needs to align its organization. Thus, performance measurement is used to guide everyone's actions, and is clearly linked with individual incentive systems.

To define performance measures, Nokia identifies the critical success factors to compete in NET business. For each factor, BSC-NET measures a specific performance indicator and it groups them into four perspectives: Financial, Customer, Process, and People and Learning. Overall, BSC-NET contains 14 performance measures. Appendix 3A reports the critical success factor, the formulas, and the measurement timing associated with each performance indicator. BSC-NET defines the reinforcing linkages which are supposed to connect the measures according to a vertical value chain across measurement perspectives, from People and Learning to Financial. Namely, People and Learning is supposed to directly impact Process, whose results are supposed to affect Customers, which leads to Financials (see Figure 3.5).

The accountability system underlying the BSC-NET is based on three key responsibilities. Each performance measure has a Business Owner, a Measure Owner, and a Measure Manager. The Business Owner is responsible for target setting, continuous follow up of performance and achievement of targets, and taking actions based on the measured performance. The Measure Owner is responsible for defining the measure concept explicitly, setting up the systems to gather data, ensuring consistent implementation across the entities in line with the definition, and raising awareness of potential discrepancies and promoting unification when necessary. The Measure Manager is responsible for maintaining the measure, and providing the measure data according to a defined schedule. In addition, for each measure, NET-BSC software sets the unit of measurement, the data source, data storage location, the monitoring cycle, the reporting organizational unit, and the applicable entities.

Lastly, a global organizational function at the headquarters, called Quality, is in charge of reviewing, modifying and updating the BSC-NET structure and content.

Short-term incentive plan (STIP)

In Nokia, the subsidiary's balanced performance measurement system is strictly connected to both planning and rewarding. The planning system provides targets for each performance indicator contained in BSC-NET;[29] the reward system links performance results to individual incentives. The company relies on a multidimensional measurement approach not only to represent the overall performance results obtained by the organizational units, but also to pay performance-dependent rewards to individuals. This paper focuses on the NET performance-dependent incentive system.

Prior to the NET-BSC implementation, Nokia Italy provided incentives to sales and marketing employees only. These incentives were based on management judgments, meaning they had qualitative targets, performance achievements were subjectively determined, and superiors had discretion in setting the size. Moreover, they differed across national subsidiaries.

Two years after the NET-BSC implementation, Nokia's headquarters implemented a worldwide NET short-term incentive plan (hereafter called NET-STIP). The new system sets the criteria to measure, evaluate, and reward the performance of each employee in every subsidiary. Nokia's famous motto, i.e. "Nokia - Connecting People",[30] also captures the company's intent in implementing the new incentive system: Nokia seeks to shape its organization, by orienting individual behaviors towards common global strategic objectives measured by the NET-BSC indicators. Specifically, NET-STIP is a formula-based monetary

[29] NET has a planning system based on three fundamental phases. The long-term planning sets generic strategic objectives mainly for performance associated to Financials and Customers measurement perspectives. The short-term planning sets performance targets every six months for all the four measurement perspectives considered by BSC-NET. The so-called "latest-estimate" reviews performance targets on a monthly basis.

[30] Nokia adopted the motto "Nokia – Connecting People" in 1993. Together with the ten years old vision, "Voice goes mobile!", it represents a worldwide symbolic element of the company's image.

incentive plan, balancing individual performance with the sum of team-based and company-based multipliers; it includes all subsidiary's employees; and it determines cash bonuses which are paid every six months. The NET-STIP of an individual *i* calculates his/her semiannually cash bonus ($Bonus_s$) according to the following formula:

$$Bonus_s = (\sum_{m=2}^{M}(pms_m * pmw_m)) * (\frac{0{,}25 * NETM + 0{,}75BTM_i}{100}) * JG_i * SAL_i * \frac{sd_s}{365}$$

where pms_m = performance measure score achieved on the performance measure *m* (range 1-150); pmw_m = performance measure weight on performance measure *m* (range 0-1); JG_i = annual cash bonus associated with the target value for the job grade of individual *i* (range 0-1); *NETM* = NET multiplier (range 0-1); BTM_i = multiplier associated with the business team of individual *i* (range 0-1); *sd* = total days in semester *s* for individual *i* (range 0-183);[31] *SAL* = annual salary of individual *i*.[32]

Thus, according to this NET-STIP formula, cash bonuses depend on four factors: (i) individual performance score; (ii) group-based performance multipliers; (iii) job grade; (iv) and annual salary.

Each individual incentive plan has at least two performance measures (indicated by the minimum value of *M*). Performance measures are based on multiple measurement perspectives and can be quantitative or qualitative. Each performance measure has a target and is balanced with an explicit performance measure weight (*pmw*). For each measure, the actual result is compared with the target to determine the performance measure score (*pms*). The weighted sum of the *m* measures contained in the individual NET-STIP is the individual performance score. This score is multiplied by a composite group-based performance multiplier, taking into account the actual results achieved worldwide by NET (*NETM*) plus

[31] Individual plans may have different days because individuals change employment conditions such as positions, business team, and job grade. Whenever this change occurs, a new additional plan is set for the individual who will get a bonus at the end of the semester, on the basis of multiple plans balanced for the related days.

[32] The company did not provide minimum and maximum of annual salary.

the actual results achieved worldwide by the business team of the individual (*BTM*). Headquarters does not disclose the two multipliers separately; subsidiaries know only the composite multiplier for each business team.[33] The individual performance score weighted by the group-based performance multiplier is then multiplied by the target associated to the job grade of the individual (JG_i). NET has eight possible job grades related to different levels of qualification. NET-STIP sets minimum and maximum size of annual cash bonuses for each job grade.[34] The size of annual cash bonuses varies from a minimum of 1.75% to a maximum of 45% of annual salary depending on job grade. Finally, the actual cash bonus is related to the individual annual salary (*SAL*) weighted by the days taken into account in the NET-STIP (*sd*). Appendix 3B provides an example of an actual NET-STIP included in this study.

NET-STIP is not the only performance-dependent incentive system in place in Nokia Italy. Two other programs aim to motivate individual to achieve high performance. First, "Achievement Awards" program rewards the achievements of crucial targets with special prizes. Second, higher-level managers receive stock options on the basis of an "Equity Program" and their salaries are linked to Nokia's Earning per Share. The rarity of special prizes and the low number of individuals involved in the equity-based incentive are the main reasons why I believe they do not bias the findings on the relationship between incentive and individual performance obtained by this study that only includes the NET-STIP data.

[33] Group-based performance multipliers are based on the achievement of group-based performance results. These results refer to three main financial indicators: Sales; Contribution Margins; and Net Working Capital. Headquarters does not reveal the values of NETM and BTM, separately. It does disclose to the subsidiaries the composite group-based multiplier. It also reveals that in the composite multiplier NETM and BTM weigh 0,25 and 0,75, respectively; as reported by the formula.

[34] The minimum corresponds to 35% of the cash bonus awarded at target level; the maximum corresponds to 150% of the cash bonus awarded at target level.

IV. METHOD

Data Collection

This study is based on a combination of a questionnaire survey designed by the researcher and proprietary archival data provided by the company.

The archival data allow constructing the incentive-related variables that capture incentive system characteristics. The company provided three periods of STIPs for all individuals employed by Nokia Italy (about 460) except those employed by the Mobile Phone business group (about 40) and those with the highest job grades (about 15). The reason of the former exception is because Mobile Phone is a separate legal entity, different from the rest of the subsidiary, employing different managerial systems. The latter exclusion is due to confidentiality restrictions of managers with the highest level of responsibility within the organization. The private dataset contains the following types of information for each STIP: (i) Nokia Identification Number, (ii) Start and End date of the incentive plan, (iii) Business Group; (iv) Business Team; (v) Organizational Unit; (vi) Job-grade; (vii) Annual Cash Bonus at target level; (viii) Objective Description; (ix) Objective Weight; (x) Minimum, Target, and Maximum; (xi) Result; (xii) Score; (xiii) Incentive; (xiv) Payable; (xv) Annual Individual Achievement; (xvi) Business Team Multiplier; (xvii) Annual Individual Adjusted Achievement; (xix) Solid Line Manager Identification Number. All these data elements refer to different components of the formula to calculate the cash bonus. Appendix 3C defines the nineteen types of information. This study focuses on data of the most recent period in order to obtain a consistent matching between private data and survey responses that were collected during the same time period. Specifically, the dataset refers to the first semester of 2005 and

contains 444 STIPs with 2214 performance measures. 347 STIPs with 1142 performance measures refer to NET's employees.[35]

An internal survey was conducted through emailed questionnaires to assess behavioral reactions to incentive system characteristics. Nokia conducts questionnaire-based internal surveys often and extensively. The high frequency of internal surveys may cause low response rates. On the other hand, the confidence of all employees with survey instruments may increase data reliability. The company submits questionnaires to the employees in order to monitor quality, customer service, organizational climate, and many other aspects of the company's activity. In particular, once a year all employees are asked to respond to a survey (called the "Listening To You") conducted to assess the employees satisfaction that is one of the performance measures contained in the BSC-NET. "Listening To You" is a 68-item questionnaire to measure 13 constructs, namely: customer orientation (7 items), quality improvement and awareness (5 items), performance orientation (7 items), recognition and rewarding (5 items), employee motivation and involvement (9 items), teamworking (6 items), internal communication (6 items), leadership (8 items), organizational integrity (9 items), learning and development (5 items), commitment (3 items), diversity (2 items), security (2 items). This internal survey is conducted by headquarters, which submits the questionnaires, analyzes the data, and reports results to the local units. Subsidiaries are allowed to extract average index for each construct referring to organizational unit with five individuals at least. I examined the survey to check its validity for my research purposes. First, few items are similar to those proposed by academic studies on the topics and differences in wording and scales are significant, limiting the comparability of results with prior research studies. Second, same items are used to measure different concepts, limiting interpretation of

[35] 347 STIPs correspond to 325 individuals (see Table 3.1). During the first semester of 2005, 17 individuals changed job-grade and 5 individuals changed business team. That's why 22 individuals have two STIPs for the period under investigation. Only the most recent STIP was considered as valid for the analysis: the survey responses of the individual were related to the incentive characteristics shown by his/her most recent STIP.

responses. Lastly, at the subsidiary level only aggregated data are available, making both reliability tests of the instrument and the matching with the STIP data unfeasible. No information at individual levels is available. Because of these limitations, I considered the internal instrument not usable for my research purpose. As a consequence, I designed a different questionnaire including survey instruments taken from prior academic literature. Nokia Italy accepted to submit the questionnaire to a convenience (i.e., non-probability) sample.[36] The company did not want to involve all employees to avoid competition between official corporate surveys and external research projects. Table 3.1 describes the sampling procedure. One business unit (i.e., Service) and two corporate functions (i.e., Human Resources and Finance and Control) form the survey population (see Figure 3.4).[37] These organizational units were selected by NET's management for three reasons. First, Service is the largest business unit within NET. Second, Service is a recent business unit created to emphasize customer-oriented strategies: NET's management considers it as a strategic organizational unit and had high interest in examining the new structure.[38] Third, two corporate functions were added to take into account business support units. Table 3.2 shows the representativeness of the survey population. Service employees represent 59% of those employed by the business units; Human Resource and Finance and Control employees represent 51% of those employed by the corporate functions. More specifically, the questionnaire was emailed to 210 employees (51% of total) in 16 different departments. The survey population involves 5 job-grades. Prior to emailing the questionnaire, I submitted it to the scrutiny of four faculty colleagues and three NET managers for pre-testing. In particular,

[36] Van der Stede et al. (2005) report that 71% of survey studies in management accounting "use some sort of convenience sample".

[37] Service is the business unit responsible for the delivery and implementation of customers' networks and infrastructure.

[38] The creation of a new business unit did not imply any change in the core NET's business strategy. Yet, the new organization was designed to better fit the intended strategy, by emphasizing the role of service activities in generating profitable results. NET's internal structure was subjected to modifications many times in the past five years. However, the matrix form with three business unit has never changed.

NET managers checked for the clarity of the questions and their consistency within NET working environment.[39] The survey was conducted in English, since English is the language officially used in business-related communication by Nokia (both internally and externally). The use of English as the common language of the research overcomes interpretation problems associated with the translation of questionnaires into other languages. The purpose of the survey was presented by the researcher during a monthly meeting with Service's managers; directors of Human Resources and Finance and Control departments were present too. The questionnaire was administered online. The survey population received an email containing an explicit statement on the purpose of the survey and a weblink to an ad-hoc designed website. As Appendix 3D shows, the website's homepage reported the instructions, a confidentiality statement, and a login box to access the questionnaire. Respondents accessed through their own Nokia Identification Number which I used to match survey responses with STIP data. The company did not disclose the names associated with the identification numbers and I did not disclose the identification numbers associated with the responses. In this way, confidentiality was assured. The questionnaire was available online for four weeks. A reminder was emailed after two weeks.

I used both proprietary and survey to determine measures of individual performance. In the literature, it is not clear whether objective performance is a superior measure with respect to self-rated performance (Vankatraman and Ramanujan, 1987; Steers, 1975). In particular, Van der Stede et al. (2005) point out that objective and subjective measures for performance are not necessarily conceptually congruent. Therefore, I included in the survey two instruments

[39] This check revealed the inconsistency of the measure for performance borrowed by the researcher from Mahoney et al (1963). This self-rating measure of *managerial* performance is widely employed in accounting research as an overall indicator of *individual* performance. However, it was developed to measure *eight* dimensions (i.e. planning, investigating, coordinating, evaluating, supervising, staffing, negotiating, and representing) of performance and an overall score of *effectiveness*. Since my study involved employees at different job-grades, managers noticed the measure was not adequate. I found their considerations as reasonable motivation for changing the instrument (see next section for details on the measures used in this study).

capturing individual performance and obtained an objective performance indicator from the STIP data.

Table 3.1. Sampling.

SAMPLING PROCEDURE	Description	Number of Observations	%
Horizontal Groups	Customer and Market Operation	32	
Business Groups	Multimedia	11	
	Enterprise Solutions	5	
	Networks	325	
Corporate Functions	Corporate Functions	39	
Target Population*	Nokia Italy	**412**	196%
Business Units	Services	192	
Corporate Functions	Finance & Control	10	
	Human Resources	8	
Survey Population	Available Respondents	**210**	100%
Business Units	Services	119	
Corporate Functions	Finance & Control	9	
	Human Resources	4	
Respondents	Returned Questionnaires	**132**	63%
*Incomplete Answers***	Missing values >19 items, i.e. 30% of total	12	
Invalid Answers	All items report the same score	1	
Survey Sample	Valid Responses	**119**	57%
Outliers	Less than four Performance Measures	1	
Missing matching	Respondents with STIP unavailable	6	
Final Sample	Data included in the analysis	**112**	53%

* Target population includes individuals with job grade lower than 11
**10 incomplete answers refer to the final 20-item question.

Finally, I collected information through field work in order to corroborate my findings. I discussed the hypotheses, method design, measurement, results, and conclusions with internal

contacts to enhance the methodological techniques and theoretical arguments used for this research. Table 3.3 provides details on the interactions between the company and the researcher.

Table 3.2. Sample representativeness in term of job-grades and incentive plan characteristics.

JOB GRADE	Target Population	Survey Population	Respondents	Survey Sample	Final Sample
5	3 *0.73%*	0 *0.00%*	0 *0.00%*	0 *0.00%*	0 *0.00%*
6	15 *3.64%*	7 *3.33%*	5 *3.79%*	4 *3.36%*	4 *3.57%*
7	63 *15.29%*	38 *18.10%*	25 *18.94%*	20 *16.81%*	20 *17.86%*
8	102 *24.76%*	86 *40.95%*	39 *29.55%*	36 *30.25%*	35 *31.25%*
9	136 *33.01%*	50 *23.81%*	40 *30.30%*	36 *30.25%*	36 *32.14%*
10	93 *22.57%*	22 *10.48%*	17 *12.88%*	17 *14.29%*	17 *15.18%*
11	- -	7 *3.33%*	6 *4.55%*	6 *5.04%*	0 *0.00%*
TOTAL observations	412	210	132	119	112

STIP-based Variables		Target Population	Survey Population	Final Sample
# of performance measures (NMEAS)	Mean	5.39	5.67	5.37
	St. Dev	1.63	1.64	0.66
Measurement Concentration Index (MCI)	Mean	25.99	24.30	22.56
	St. Dev	10.30	9.10	4.37
# of subjective performance measure (NSUBJ)	Mean	nc*	2.52	2.40
	St. Dev	nc*	1.18	0.94
Weight on subjective performance measure (SUBJ)	Mean	nc*	53.44	50.04
	St. Dev	nc*	27.78	20.29
Number of observations		**412**	**210**	**112**

nc: Not Computed because researcher classified only the performance targets included in the survey population (1142 performance targets of survey population, i.e. 51.5%, versus 2214 performance targets of the target population)*

Table 3.3. Field study techniques used in this study.

This paper does not refer to a field study. However, this table is intended to provide a list of the techniques used to get valuable information needed to understand the research site where I conducted a questionnaire survey. Since both archival and survey data used by this paper refer to one company, the knowledge of the organizational context is crucial to understand empirical evidence. The following table does not report the amount of emails (for reason of brevity) and documents (for reason of confidentiality) shared with internal contacts.

Techniques	Hours
Face-to-face interview on site	
with country controller	
- about the Nokia's strategy and organization	1
- about performance measurement system (i.e. NET-BSC)	2
- about incentive plan (i.e. STIP)	2
- about preliminary empirical findings	2
with HR managers	
- about internal survey questionnaire (see Appendix 3D)	1
- about the Nokia's annual survey (Listening to You)	1
- about the incentive system dataset	1
Presentation of the project to services managers	3
13 participants: country controller, services director, hr director, 9 services manager	
Conference calls	5

Operationalization

I operationalized the constructs under examination through multiple variables. This sub-section defines each variable and the related measures used to analyze the interactions among them. Appendix 3E provides a summary of these operationalizations. Appendix 3B describes the construction of objective (i.e., non-survey-based) measures.

Incentives

This study focuses on two fundamental incentive system characteristics: measurement diversity and subjectivity.

I constructed two indexes for measurement diversity. NMEAS counts the number of performance measures contained in the individual STIP. MCI is the Measurement

Concentration Index: for high (low) values of MCI, measurement diversity in incentive plan is low (high). MCI is calculated according to the following formula:

$$MCI = \sum_{m=1}^{M} (pmw_m)^2$$

where pmw_m = performance measure weight on performance measure m.

MCI attempts to capture to what extent an incentive plan has measurement diversity. Consistent with Moers (2005) and Ittner et al. (2003), I define measurement diversity as the use of multiple performance measures. Recently, management accounting research has devoted considerable attention on the effects of additional (typically non-financial) performance indicators (e.g., Van der Stede et al., 2006; Chenhall, 2005; Said et al., 2003; Banker et al., 2000; Scott and Tiessen, 1999). However, operationalization of measurement diversity varies across studies. The concept of measurement diversity emphasizes three fundamental elements of performance measurement systems: first, in a performance measurement system based on multiple measures there must be an interaction of different indicators in measuring performance; second, indicators must measure different aspects (or perspectives) of performance; third, indicators must concur to measure performance with different weights. Performance measurement systems concentrated on few indicators with high weights have low measurement diversity. MCI takes into account these crucial elements. To illustrate how the index works, I propose a simple example.

Individual Incentive Plan	Performance Measures	Weight	Measurement Concentration Index
A	Sales Customer loyalty	90% 10%	82%
B	Sales Customer loyalty On-time delivery	80% 10% 10%	66%
C	Sales Customer loyalty	50% 50%	50%

According to my conceptualization, in the above example, the individual incentive plan C has the highest level of measurement diversity, because it reports the lowest MCI.[40]

I constructed two indexes for subjectivity. NSUBJ counts the number of subjective performance measures contained in the individual STIP. SUBJ is the weight put on subjective performance measures in the individual STIP. Subjectivity has several possible meanings, and, therefore, prior literature provides various operationalization of the concept. NSUBJ and SUBJ are intended to capture to what extent performance measurement and evaluation rely on superior's discretion. Specifically, I coded the following cases as subjective performance measures: (i) generic and qualitative performance measure (e.g., "Internal Communication Activity"); (ii) qualitative performance measures not referring to balanced scorecard indicators (e.g., "Administrative Team Support"); (iii) performance measures on competence development (e.g., "Enrich yourself"). All three cases contain discretionary evaluation of individual performance.

Individual Behavior

This paper studies the effects of measurement diversity and subjectivity on two sets of behavioral variables. I used multi-item questionnaire instruments to capture individual organizational stress and self-regulatory behavior, employing a seven point Likert type scales. Some of the items were reversed coded to minimize the potential for acquiescence error. I recoded these items prior to the creation of the measurement scale.

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[40] I also constructed an additional version of the index based on the measurement perspectives (I called it perspective concentration index). I classified the performance measures included in the STIPs into the four categories of BSC-NET. Then, I computed the index by considering the overall weight put on each perspective. For example, in case of an individual STIP with 4 financial measures equally weighted 25%, the MCI would be 25%; whereas, the perspective concentration index would be 100% since they refer to the same measurement perspective. Empirical analyses reveal that this additional measure is less powerful in explaining relationship among variables. For reason of simplicity and brevity, I report the results based on MCI and NMEAS. However, it has to be noticed that the perspective concentration index is positively correlated with the objective measure of individual performance. This indicates a negative relationship between measurement diversity and individual performance.

I operationalized organizational stress as role conflict and role clarity. To measure these two variables, I used the instrument developed by Rizzo et al. (1970) and constructed two measures: ROLCON and ROLCLA for role conflict and role clarity, respectively. The instrument consists of a 30-item question: 15 questions deal with role conflict and 15 questions deal with role clarity.[41] Notwithstanding some caveats (e.g., Siegall, 2000), both the psychology and management literatures consider this measure as an adequate indicator of role stress (e.g., Harris and Bladen, 1994; Netemeyer et al., 1990). In particular, the instrument allows distinguishing the two aspects of organizational stress. Most accounting research studies used an alternative instrument proposed by Kahn et al. (1964) to study the effect of performance evaluation on behavior (e.g., Marginson and Ogden, 2005; Otley and Pollanen, 2000; Harrison, 1993). However, the instrument is essentially a summary measure of organizational stress, namely job-related tension.[42] Rizzo showed that role conflict and role clarity are correlated, yet separate concepts, explaining organizational stress.

To capture self-regulatory behavior, I measured two variables (i.e., feedback seeking behavior through monitoring and through inquiry) based on the instrument proposed by Ashford (1986). Her instrument is a 6-item question with four items dealing with feedback-seeking behavior through monitoring and two items dealing with feedback-seeking behavior through inquiry. In the management literature, several studies on feedback-seeking adopted this measure providing satisfactory reliability statistics based on confirmatory factor analyses (e.g., Gupta et al., 1999; Morrison, 1993; Ashford and Tsui, 1991).[43]

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[41] Actually, Rizzo et al. (1970) discuss the concept of role ambiguity that is the reflected concept of role clarity. For reason of simplicity, I prefer to use the latter term.

[42] Several accounting studies found that the job-related tension measure is multidimensional (e.g., Otley and Pollanen, 2000). Indeed, job-related tension encompasses four dimensions: role ambiguity, role conflict, role overload, and resource inadequacy (Kahn et al., 1964).

[43] Confirmatory factor analysis conducted by Ashford and Tsui (1991) reveal three dimensions underlying the instrument. However, the authors adopted the measure used by Ashford in her pre-testing procedure. Since her published paper does not report the very first version of the measure (Ashford, 1986), I used the items she disclosed which are those chosen on the basis of her pretest. For the reliability of the measure I used, see next section.

I used value commitment to distinguish agent-oriented and steward-oriented individuals. VALCOM is based on the 9-item instrument developed by Schechter (1985) who found good psychometric properties for this measure. Davis et al. (1997) contend that factors differentiating agency and stewardship relations are psychological and situational. In my hypotheses, value commitment is the psychological factor expected to moderate the relationship between incentive and individual performance. Since it is based on one company, this study does not need to control for situational factors. Studies on organizational behavior argue that organizational commitment is a broad multidimensional concept (Bar-Hayim and Berman, 1992; Reichers, 1985; Buchanan, 1974). They also show that it is able to consistently operationalize organizational identification (Hall et al., 1970). Therefore, stewardship theory proposes value commitment to differentiate agent-oriented and steward-oriented individuals (Davis et al., 1997)

Individual Performance

I used one subjective and one objective measure to capture individual performance. Of the 116 survey studies in management accounting articles examined by Van der Stede et al. (2005), only 3 obtained both perceptual and objective performance measures.

SPERF is a measure of self-rated performance: respondents to the questionnaire were asked to rate their overall performance on a 7-point scale ranging from "well below average" to "well above average". The survey population includes individuals with different job grades. This implies that activities, qualifications, and responsibilities significantly vary across individuals. Therefore, the nine-dimensional instrument proposed by Mahoney et al. (1963) to measure managerial performance is not suitable for this research site under investigation in this study. Merchant et al. (2003) report that most of the behavioral studies on incentives use subjective assessments of performance.

WINPER is the weighted individual target achievement score. STIP reports performance results based on a score ranging from 1 to 150 for each performance measure. Competence development and ad-hoc designed measures are considered as individual performance measures. However, to be consistent across individuals, only one measure for each STIP is used as a proxy of individual performance. In case of STIPs containing many competence development and ad-hoc designed measures, only the one with the highest weight is considered as the individual performance measure. The score on the individual performance measure is multiplied by the weight set by the STIP, in order to take into account the relative importance to capture individual performance attributed by the STIP to a given measure.

Finally, the analysis uses job satisfaction (JOBSAT) as an additional outcome variable measured through the 20-item short version of the Minnesota Satisfaction Questionnaire (Weiss et al., 1967).[44] Many accounting researchers adopted the instrument (e.g., Otley and Pollanen, 2000; Harrison, 1992) and the psychology literature provides strong empirical support for its validity (e.g., Butler, 1983; Dunham, 1977). Several management accounting studies investigating the effect of performance measurement on individual behavior also adopted job-satisfaction as the dependent variable and interchange it with individual performance (e.g., Chenhall and Brownell, 1988; Brownell, 1982). Van der Stede et al., (2005) argue that perceptual measures for performance might be more appropriate in studies assuming individual as the level of analysis.

Variable Construction

The questionnaire was developed to measure six constructs: feedback-seeking behavior through inquiry (Ashford, 1986); feedback-seeking behavior through monitoring (Ashford, 1986); value commitment (Schechter, 1985); role conflict (Rizzo et al. 1970); role clarity

[44] The instrument captures extrinsic (6 items), intrinsic (12 items), and overall job satisfaction (20 items). In the analysis below, I discuss the results using the overall job satisfaction. Whenever significant different statistics are obtained using the other job satisfaction measures, I report the results in the footnote.

(Rizzo et el. 1970); job satisfaction (Weis et al., 1967).[45] I tested the measurement model underlying the questionnaire through multiple factor analyses, checking for reliability and construct validity of the survey instruments. Figure 3.6 reports the variable construction tree explaining the testing procedure. The data collected validate the assumptions of exploratory factor analysis (Appendix 3F). In particular, Kaiser-Meyer-Olkin statistic (0.724) indicates that the item correlation matrix is appropriate for factoring. This sub-section briefly describes the variables construction procedure.

First, I conducted an overall exploratory factor analysis with all items to examine the relationships between items and unobserved underlying factors. I run principal axis factoring, assuming an implicit underlying factor model;[46] I use the Promax oblique rotation technique so that factors are not constrained to be orthogonal to each other (Sharma, 1996). If the overall exploratory factor analysis is not satisfactory (i.e., the number of extracted factors is significantly different form the number of expected underlying factors), separate principal component analyses for each instrument are conducted to identify items with low measurement reliability or instruments affected by multidimensionality.[47] Varimax rotation technique is used when one underlying factor is expected; otherwise Promax is the oblique rotation technique used (Sharma, 1996). The procedure is repeated until the overall exploratory factor analysis extracts a number of factors closer to the number of expected variables. A confirmatory factor analysis is then employed to determine how well the questionnaire items represent the variables.[48] I used the structural equation model package

[45] Since the self-rating performance (SPERF) is measured by one item question, it is not included in the measurement model.

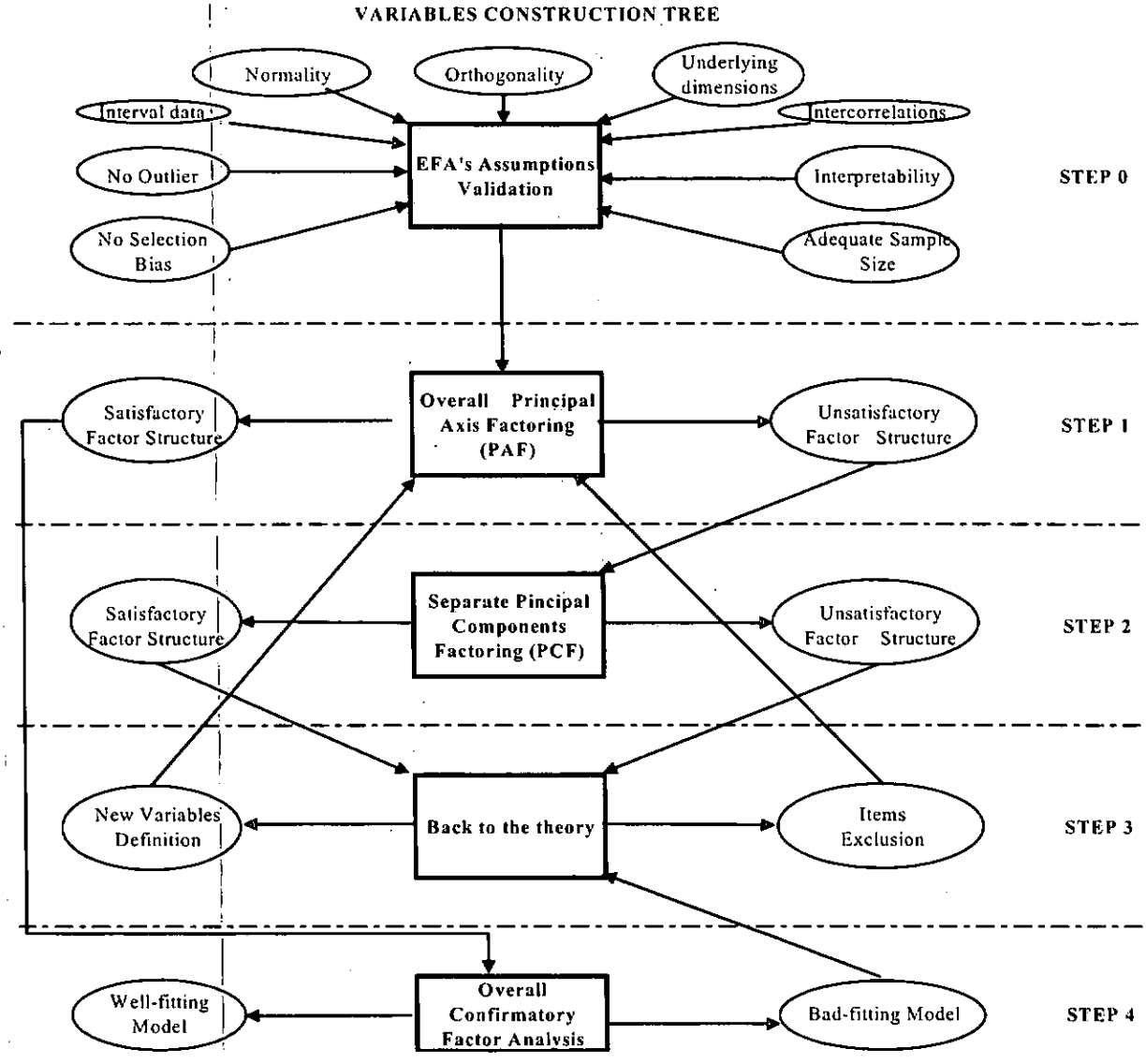
[46] On the contrary, principal component analysis assumes that the variance of a given variable is completely accounted for by the principal components (Sharma, 1996). As a consequence, it assumes that communalities are one.

[47] When a single instrument (i.e. not all items) is under investigation, I run a principal component analysis because it places emphasis on explaining the variance in the data; whereas the objective of principal axis factoring is to explain the correlation among the indicators (Sharma, 1996).

[48] As methodological references to the procedure followed by this paper, see Bollen (1989) for an explanation of structural equation model; Byrne (2001) for an illustration of AMOS features; Van der Stede (2001) for an application of confirmatory factor analysis on measurement model in accounting research.

AMOS 5.0 to test the measurement model where the scores on questionnaire items depend on their expected underlying common factor as well as measurement error.[49] The factor loadings of the retained items are used to compute weighted composite variables. Finally, Cronbach alphas are computed for each variable. Appendix 3G reports details on the steps I followed to measure the variables used in my analysis. Table 3.4 reports the factor loadings of the items entered into the analysis, and Table 3.5 provides the reliability statistics of the composite variables.

Figure. 3.6. Variables construction tree



[49] In addition, the measurement model specifies correlations between the two feedback-seeking strategies, and between role conflict and role clarity.

Table 3.4. Confirmatory factor analysis on questionnaire items.

	Item	Variable	Weight
2. In order to find out for yourself how well you personally are performing in your present job, how frequently do you			
observe what performance behaviors your superiors reward and use this as feedback on your own performance?	B1	FSBMON	0.641
compare yourself with employees at your level in the organization?	B2	FSBMON	0.649
pay attention to how your superiors act towards you in order to understand how they perceive and evaluate your performance?	B3	FSBMON	0.794
observe the characteristics of employees rewarded by superiors and use this information?	B4	FSBMON	0.692
seek information from your colleagues about your work performance?	B5	FSBINQ	0.769
seek feedback from your superiors about your work performance?	B6	FSBINQ	0.801
3. Please, indicate your opinion with regard to the following statements.			
For me, this is one of the best of all organizations for which to work.	C1	VALCOM	0.902
I am proud to tell others that I am part of this organization.	C2	VALCOM	0.895
I usually agree with this organization's policies on important personnel matters.	C3	VALCOM	0.689
I talk up this organization to my friends as a good organization to work for.	C4	VALCOM	0.806
I care about the fate of this organization.	C5	VALCOM	0.689
I find that my values and the organization's values are similar.	C6	VALCOM	0.748
I am glad I chose this organization to work for over others I was considering at the time I joined.	C7	VALCOM	0.673
This organization inspires the best in me in the way of job performance.	C8	VALCOM	0.735
4. How frequently do you feel as follows?			
I know that I have divided my time properly.	D10	ROLCLA	0.553
I receive an assignment without the manpower to complete it.	D11	ROLCON	0.638
I know what my responsibilities are.	D12	ROLCLA	0.785
I have to buck a rule or policy in order to carry out an assignment.	D13	ROLCON	0.607
I work with two or more groups who operate quite differently.	D19	ROLCON	0.425
I feel certain about how much authority I have.	D2	ROLCLA	0.586
I know exactly what is expected of me.	D20	ROLCLA	0.742
I receive incompatible requests from two or more people.	D21	ROLCON	0.609
I have enough time to complete my job.	D23	ROLCON	0.614
I receive an assignment without adequate resources and materials to execute it.	D25	ROLCON	0.694
Explanation is clear on what has to be done.	D26	ROLCLA	0.486
I work on unnecessary thing.	D27	ROLCON	0.646
I have clear, planned goals and objectives for my job.	D4	ROLCLA	0.806
I have to do things that should be done differently.	D5	ROLCON	0.503

5. Ask yourself: How satisfied am I with this aspect of my job?			
The chance to tell people what to do.	E10	JOBSAT	0.558
The chance to do something that makes use of my abilities.	E11	JOBSAT	0.567
The way company policies are put into practice.	E12	JOBSAT	0.723
My pay and the amount of work I do.	E13	JOBSAT	0.705
The chances for advancement on this job.	E14	JOBSAT	0.760
The freedom to use my own judgment.	E15	JOBSAT	0.660
The chance to try my own methods of doing the job.	E16	JOBSAT	0.661
The working conditions.	E17	JOBSAT	0.547
The way my co-workers get along with each other.	E18	JOBSAT	0.620
The praise I get for doing a good job.	E19	JOBSAT	0.735
The feeling of accomplishment I get from the job.	E20	JOBSAT	0.718
The chance to do different things from time to time.	E3	JOBSAT	0.489
The chance to be "somebody" in the community.	E4	JOBSAT	0.648
The way my boss handles his/her workers.	E5	JOBSAT	0.597
The competence of my supervisor in making decisions.	E6	JOBSAT	0.675
Being able to do things that don't go against my conscience.	E7	JOBSAT	0.605
The chance to do things for other people.	E9	JOBSAT	0.616

For the Default model, the discrepancy divided by degrees of freedom is 1733.620 / 942 = 1.840.

Table 3.5. Cronbach's alphas on the constructed variables.

VARIABLE	Alpha	# of items	Items
FSBMON	0.7808	4	B1, B2, B3, B4
FSBINQ	0.7601	2	B5,B6
VALCOM	0.9200	8	C1, C2, C3,4, C5, C6,C7,C8,C9
ROLCON	0.8129	8	D5, D11, D13, D19, D21, D23, D25, D27
ROLCLA	0.8185	6	D2, D4, D10, D12, D20,d26
JOBSAT	0.9212	17	E3, E4,E5,E6,E7,E9,E10,E11,E12,E13,E14,E15,E16,E17,E18,E19,E20
EJOBSAT	0.8919	6	E5, E6, E12, E13, E14,E19

V. RESULTS

Response rate and final sample representativeness

A total of 132 questionnaires were returned providing an overall response rate of 63%, which is acceptable (Van der Stede et al., 2005).[50] Table 3.1 describes the sampling procedure. I excluded from the analysis 20 unusable responses, 12 of which have more than 30% incomplete items; 6 refer to individuals whose STIP was not provided by the company because of their high job grade; one was considered as invalid answer because it reports the score for all the items;[51] one was excluded because the individual STIP is the only one containing less than four performance measures (see Table 3.1 for statistics on number of the measures contained in the STIPs).

Table 3.1 suggests that the final sample is representative of the target population in term of the job-grade distribution considered in the analysis. In addition, the table shows that STIPs included in the analysis have very similar characteristics to those of the overall dataset provided by the company.

Descriptive Statistics

Table 3.6 reports descriptive statistics on the survey-based variables. For this table, variables are the averages of the retained items as listed in Table 3.4. High mean value of ROLCON and low mean value of ROLCLA indicates the relevance of behavioral variables within the empirical setting. Respondents report high mean value for value commitment (VALCOM), meaning good identification with the company. Individuals seem to engage in feedback-seeking behavior with different degrees. However, as expected, mean values of the two feedback-seeking strategies are not significantly different (t-test 0.692). Finally, JOBSAT is

[50] Van der Stede et al., 2005 report that 72% of the survey studies in management accounting published in eight journals from 1992 to 2001 obtained a lower response rate.

[51] The exact value reported in this returned questionnaire is the lowest value of the scale for each item. Since some items were reversed, I considered the response invalid.

significantly lower than SPERF (t-test 6.619) meaning that individuals rate their overall performance above average even if they are not satisfied with their job.

Table 3.6. Descriptive Statistics on survey-based variables.

	N	Minimum	Maximum	Mean	Std. Dev.
SPERF	107	3.00	7.00	5.36	0.84
FSBMON	112	1.75	7.00	4.76	1.09
FSBINQ	112	1.00	7.00	4.67	1.32
VALCOM	112	1.75	7.00	5.35	1.07
ROLCON	112	3.00	7.00	5.33	0.81
ROLCLA	112	1.43	6.43	3.68	0.98
JOBSAT	112	2.41	6.47	4.57	0.95

Variables in this table are the averaged scores on the related questionnaire items. SPERF (1 item): self-rating variable of individual performance; FSBMON (4 items): feedback-seeking behavior through monitoring; FSBINQ (2 items): feedback-seeking behavior through inquiry; VALCOM (8 items): value commitment; ROLCON (8 items): role conflict; ROLCLA (6 items): role clarity; JOBSAT (17 items): job satisfaction.

Table 3.7. Descriptive Statistics on STIP-based variables.

	N	Minimum	Maximum	Mean	Std. Dev.
MCI	112	17.50	41.50	22.56	4.37
NMEAS	112	4.00	6.00	5.37	0.66
SUBJ	112	0.00	100.00	50.04	20.29
NSUBJ	112	0.00	5.00	2.40	0.94
WINPERF	112	0.10	0.90	0.30	0.14

Variables in this table are constructed on the basis of the private STIP-dataset.MCI (0-100): measurement concentration index; NMEAS: number of performance measures contained in the individual STIP (4-6); SUBJ (0-100): weight placed on subjective performance measures; NSUBJ (0-6): number of subjective performance measures; WINPERF (0-100): weighted individual performance.

Table 3.8. Pearson correlations coefficients and significance level (2-tailed)

Corr. Coeff. Sign. 2-tailed	FSBMON	FSBINQ	VALCOM	ROLCON	ROLCLA	JOBSAT	WINPERF	MCI	NMEAS	NSUBJ	SUBJ
SPERF	0.057	0.087	-0.025	-0.002	0.155	0.100	-0.123	-0.124	0.026	0.008	0.044
	0.562	0.372	0.801	0.984	0.112	0.305	0.207	0.201	0.792	0.933	0.650
FSBMON		**0.405**	0.059	**0.221**	-0.017	0.145	-0.107	-0.090	0.074	-0.007	-0.047
		0.000	0.538	0.019	0.855	0.126	0.260	0.346	0.440	0.943	0.620
FSBINQ			**0.196**	0.065	**0.167**	**0.201**	-0.074	-0.021	-0.046	-0.013	0.037
			0.038	0.495	0.078	0.034	0.438	0.827	0.629	0.889	0.699
VALCOM				**-0.291**	**0.545**	**0.681**	0.132	0.051	-0.093	-0.140	-0.054
				0.002	0.000	0.000	0.166	0.593	0.332	0.142	0.570
ROLCON					**-0.260**	**-0.161**	**-0.160**	**-0.217**	**0.176**	**0.185**	0.072
					0.006	0.091	0.092	0.022	0.063	0.051	0.452
ROLCLA						**0.574**	0.097	0.035	-0.050	-0.128	-0.083
						0.000	0.310	0.717	0.604	0.178	0.387
JOBSAT							0.062	-0.014	-0.052	-0.083	0.006
							0.513	0.884	0.587	0.382	0.947
WINPERF								**0.431**	**-0.363**	**-0.163**	0.030
								0.000	0.000	0.086	0.757
MCI									**-0.845**	0.097	**0.301**
									0.000	0.309	0.001
NMEAS										**-0.196**	**-0.457**
										0.039	0.000
NSUBJ											**0.860**
											0.000

Survey-based variables (i.e. FSBMON; FSBINQ. VALCOM. ROLCON. ROLCLA. JOBSAT) the weighted sum of the standardized item scores. using factor loadings of the model tested through confirmatory factor analysis. STIP-based variables except WINPERF (i.e. MCI. NMEAS. SUBJ. NSUBJ) are the z-scores of the related measures.

Table 3.7 reports descriptive statistics on STIP-based variables. The table is helpful to describe the average individual STIP: on average, individuals have STIP containing five performance measures (see NMEAS) and the mean value of MCI is 23%. This means that performance evaluation relies on multiple performance measures extensively and superiors tend to balance performance measures with different weights. On average, two performance measures for each STIP are subjective (see NSUBJ) and they account for 50% of the incentive plan. Finally, WINPERF is the indicator for individual performance that takes into account both the actual performance score achieved by the individual and the weight placed on the specific performance measure considered to construct the index. Non-tabulated results show that, on average, individuals beat the target of the measures considered by WINPERF; the mean value of the weight placed on these measures is 23%.

Table 3.8 reports the Pearson correlation coefficients among the variables. H1a predicts a negative association between measurement diversity and role conflict. ROLCON is significantly correlated with MCI and NMEAS. Specifically, role conflict is negatively associated with the measurement concentration index (MCI), suggesting a significant positive relationship ($p < 0.05$) between role conflict and measurement diversity. Further, role conflict is positively associated with the number of performance measures contained in the individual STIP (NMEAS), suggesting a significant positive relationship ($p < 0.10$) between role conflict and measurement diversity. Results in Table 3.8 support H1a. H1b predicts negative association between measurement diversity and role clarity. ROLCLA is not significantly correlated with MCI and NMEAS ($p > 0.10$), suggesting that measurement diversity does not univariately affect role clarity.

H2a predicts positive association between subjectivity and role conflict. ROLCON is positively correlated with SUBJ and NSUBJ. However, the correlation with SUBJ is not significant at the 10% significance level; whereas, the correlation with NSUBJ is significant

($p = 0.05$). This suggests a positive relationship between the number of subjective measures included in the individual STIP and role conflict. Results partially support H2a. H2b predicts a negative association between subjectivity and role clarity. Results do not support this hypothesis since ROLCLA is not significantly correlated with the subjectivity variables (i.e., SUBJ and NSUBJ).

H3a predicts a negative association between role conflict and individual performance. ROLCON is significantly correlated with two of the three measures used for individual performance. Specifically, role conflict has a negative relationship with both the weighted individual performance set by the STIP (WINPERF) and the self-reported job satisfaction (JOBSAT). The correlation between ROLCON and SPERF is not significant. Overall these results support H3a. H3b predicts a positive association between role clarity and individual performance. ROLCLA has a strong positive relationship with JOBSAT, indicating that role clarity is positively linked to job satisfaction. However, ROLCLA has a statistically insignificant relationship with SPERF and WINPERF, indicating that the independence between role clarity and individual performance cannot be rejected. Overall, there results provide partial support for H3b.

H4 predicts a positive association between subjectivity and feedback-seeking behavior through inquiry. The insignificant Pearson correlation coefficients between the two measures used for subjectivity (i.e., NSUBJ and SUBJ) and FSBINQ do not support H4.

H5 predicts a positive association between feedback-seeking behavior and individual performances. However, except for a significant positive relationship between feedback-seeking behavior through inquiry and job satisfaction, measures of individual performance (i.e., SPERF and WINPERF) are not significantly correlated with the two measures for feedback-seeking behavior (i.e., FSBMON and FSBINQ). Thus, results provide partial support only for H5.

The hypotheses from H6 to H8 deal with the moderating effect of value commitment on the relationship between incentive characteristics and behavioral variables. VALCOM is significantly correlated with FSBINQ, ROLCON, and ROLCLA, suggesting that value commitment has a positive relationship with feedback-seeking behavior though inquiry; a negative relationship with role conflict; and a positive relationship with role clarity. However, testing the last set of hypotheses requires a multivariate approach. The remainder of this section examines, firstly, the mediating effect of behavioral variables and, secondly, the moderating effect of value commitment.

The mediating effect of human behavior

Figure 1 represents human behavior as a mediating variable of the relationship between incentives and individual performance. Mediators are intervening variables explaining *how* external events affect psychological processes (Baron and Kenny, 1986). An intervening variable model predicts X1 → X2 → Y (Luft and Shields, 2003); that is, the relationship between X1 and Y is explained by an indirect effect whereby X1 affects X2 which, in turn, affects Y. Thus, intervening variable models provide supplementary information about the relationship between X1 and Y (Luft and Shields, 2003). Statistically, a full mediation exists if a significant relationship between the independent variable and dependent variable becomes insignificant after controlling for the effects of intervening variables; a partial mediation can be assumed if the independent variable and dependent variable is still significant after controlling for the effects of intervening variables (e.g., Nouri and Parker, 1998). Hartmann and Moers (1999) recommend using path analysis to test mediation. In path analysis a regression is done for each variable in the model as a dependent on others which the model indicates are causes (e.g., Venkatraman, 1989; Brownell and McInnes, 1986). A path coefficient is a standardized regression coefficient showing the direct effect of an independent variable on a dependent variable in the path model. Structural equation modeling

may be used as a more powerful alternative to path analysis; it serves purposes similar to multiple regression, but in a more powerful way which takes into account the modeling of interactions, nonlinearities, correlated variables, measurement error, correlated error terms, multiple latent variables each measured by multiple indicators (Bollen, 1989).

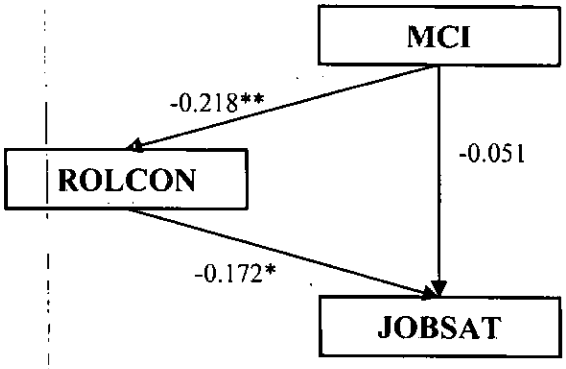
Table 3.8 shows that there is a significant path coefficient (-0.217) linking measurement diversity (measured by MCI) and role conflict (measured by ROLCON). Further, there is a significant path coefficient (-0.16) between role conflict and individual performance (measured either by JOBSAT or by WINPERF). Finally, correlation matrix reports a significant path coefficient (0.431) between measurement diversity and individual performance (as measured by WINPERF). Figure 3.7 Panel A reports results of a structural equation model run by AMOS 5.0 (Byrne, 2001), testing the intervening effect of role conflict in the relationship between measurement diversity and individual performance measured by JOBSAT. The model (Probability level =0.947) supports the hypothesis of a full mediation of role conflict in explaining the association between measurement diversity and job satisfaction. Figure 3.7 Panel B shows the same structural model where individual performance is measured by WINPERF. For this second model (Probability level =0.947) role conflict is not a significant intervening variable after controlling for measurement diversity. In fact, measurement diversity is the sole significant determinant of individual performance measured by WINPERF.

Table 3.8 shows that there is a non-significant path coefficient (0.035) linking measurement diversity (measured by MCI) and role clarity (measured by ROLCLA), and a significant path coefficient (0.574) linking role clarity and individual performance (measured by JOBSAT). The structural equation model, testing the intervening effect of role clarity in the relationship between measurement diversity and individual performance measured by JOBSAT supports

that measurement diversity does not affect role clarity which instead does affect individual performance. This provides further support to reject H1b and to accept H3b.

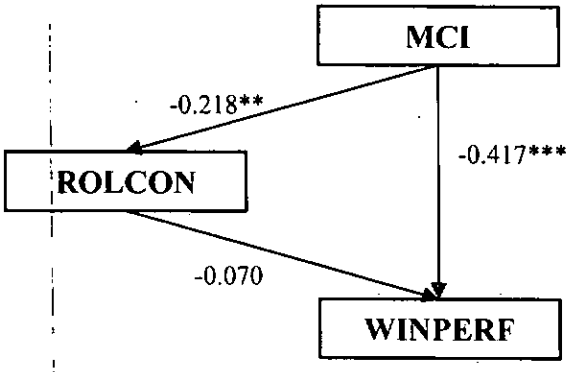
Figure 3.7. Role conflict as mediating variable within the relationship between measurement diversity and individual performance.

Panel A. Job satisfaction.



Chi-square = 0.004
Degrees of freedom = 1
Probability level = 0.947
** Path coefficient ($p < 0.05$)
* Path coefficient ($p < 0.10$)

Panel B. STP-based individual performance measure.



Chi-square = 0.004
Degrees of freedom = 1
Probability level = 0.947
** Path coefficient ($p < 0.05$)
* Path coefficient ($p < 0.10$)

These analyses provide partial support for the mediating effect of role conflict and role clarity within the relationship between measurement diversity and individual performance. Specifically, z-score correlation matrix and structural equation modelling reveal that measurement diversity has a strong, indirect, and negative effect on individual performance as measured by objective STIP-based individual performance. Role conflict does fully mediate the relationship between measurement diversity and job satisfaction. Instead, role clarity is not a significant intervening variable. In an additive model (Luft and Shields, 2003) where role clarity and measurement diversity are predictors of job satisfaction, role clarity is the only significant independent variable. Thus, role clarity and measurement diversity appear to be independent variables.

Table 3.8 shows that there is a significant path coefficient (-0.185) linking subjectivity (measured by NSUBJ) and role conflict (measured by ROLCON). Further, there is a significant path coefficient (-0.16) between role conflict and individual performance (measured either by JOBSAT or by WINPERF). Finally, correlation matrix reports a significant path coefficient (-0.163) between subjectivity (as measured by NSUBJ) and individual performance (as measured by WINPERF). The structural equation model, testing the intervening effect of role conflict in the relationship between subjectivity and individual performance measured by WINPERF, supports the positive association between subjectivity and role conflict, but it provides statistically insignificant estimates for the path coefficients linking role conflict and subjectivity to individual performance. These results are difficult to interpret; however, they add further support to H2a. Z-score correlation matrix shows no association between subjectivity and role clarity, and between subjectivity and feedback-seeking behavior through inquiry. These simple tests are sufficient to argue that the intervening effect of role clarity and feed-back seeking is weak within the relationship between subjectivity and individual performance.

The moderating effect of model of man

Figure 1 represents model of man as moderating variable within the relationship between incentives and individual performance. Moderators are interaction variables affecting *direction* or *strength* of the relationship between the independent variable and a dependent variable (Baron and Kenny, 1986). An interaction variable model predicts X1xX2 → Y (Luft and Shields, 2003); that is, there is interaction between X1 and X2 in explaining Y. Based on Arnold (1982), Luft and Shields (2003) state that moderating variables are those not associated with either the dependent or independent variable; they use the label independent-variable interaction model if the hypothesized moderating variable is correlated with the other variables in the model. Hartmann and Moers (1999) criticized the interaction models used in budgetary research, providing helpful guidelines for any study investigating moderating variables. The authors provide a review of the application of moderated regression analysis, showing that 27 of the 28 published papers included in their review exhibit at least one statistics-related error (Hartmann and Moers, 1999). I refer to their work to develop an analysis on the moderating effect of value commitment on behavioral variables.

First, Table 3.9 reports a subgroup correlation analysis where I classified respondents into two sub-sets depending on the standardized weighted average score on the eight items capturing value commitment: agents are respondents with VALCOM below the average; stewards are respondents with VALCOM above the average. Results suggest that value commitment affects the strength of the relationship between role conflict and measurement diversity, between role clarity and subjectivity, and feedback-seeking behavior and subjectivity. Specifically, ROLCON and MCI are negatively correlated only for stewards, meaning that high value commitment exacerbates the negative effect of measurement diversity on role conflict. These results provide partial support for H6a. NSUBJ and ROLCLA are negatively correlated only for agents, meaning that low value commitment

exacerbates the negative effect of subjectivity on role clarity. This partially supports H7b. Further, NSUBJ and FSBINQ are negatively correlated only for agents, meaning that low value commitment changes the direction of the relationship linking subjectivity and feedback-seeking behavior through inquiry: agents do not seek feedback even in case of high subjectivity in performance evaluation. This offers partial support for H8.

Table 3.9. Sub-group correlation coefficients

	Agent		**Steward**	
	Coef.	Sig. (2-tailed)	Coef.	Sig. (2-tailed)
MCI-ROLCON	-0.215	0.155	**-0.220**	0.073
NMEAS-ROLCON	0.196	0.196	0.173	0.162
MCI-ROLCLA	-0.022	0.884	0.070	0.573
NMEAS-ROLCLA	0.074	0.630	-0.182	0.140
SUBJ-ROLCON	0.188	0.217	0.012	0.922
NSUBJ-ROLCON	0.201	0.185	0.174	0.160
SUBJ-ROLCLA	-0.245	0.104	0.072	0.560
NSUBJ-ROLCLA	**-0.250**	0.098	0.002	0.985
SUBJ-FSBINQ	-0.187	0.219	0.194	0.115
NSUBJ-FSBINQ	**-0.274**	0.069	0.165	0.181
# of Obs.	45		67	

As recommended by Hartmann and Moers (2003), I used moderated regression analysis where the dependent variable is the incentive characteristic (measurement diversity or subjectivity) and the independent variables are the behavioral variable, value commitment, and the interaction term between behavior and value commitment (Southwood, 1978). Table 3.10 shows that value commitment has a significant interaction effect with subjectivity (measured by NSUBJ or SUBJ) in explaining feedback-seeking behavior. This result support H8. Moderated regression models including role conflict and role clarity as dependent variable do not support the moderating effect of value commitment, because the interaction effect with incentive characteristics is not statistically significant.

Table 3.10. Interaction effect of value commitment and subjectivity.

Dependent Variable: FSBINQ

	Standardized Coefficients	t	Sig.
VALCOM	0.171	**1.836**	0.069
SUBJ	0.014	0.151	0.880
VALCOMXSUBJ	0.209	**2.223**	0.028

F-value: **3.243**
p-value: 0.025
# of obs.: 112

However, Table 3.11 shows that value commitment affects role conflict even after controlling for the significant coefficient of measurement diversity (measured by MCI or NMEAS). This suggest that the relationship between value commitment and measurement diversity is additive (Luft and Shields, 2003), indicating that they have independent explanatory power as determinants of role conflict. Finally, remaining moderated regression models (not-tabulated) reveal that value commitment is the sole determinant of role clarity, while controlling for measurement diversity or subjectivity.

Table 3.11. Interaction effect of value commitment and measurement diversity on role conflict.

Dependent Variable: ROLCON

	Standardized Coefficients	t	Sig.
VALCOM	-0.281	**-3.116**	0.002
MCI	-0.212	**-2.252**	0.026
VALCOMXMCI	0.032	0.341	0.734

F- value: **5.219**
p-value: 0 .002
# of obs.: 112

Analyses on the moderating effect of value commitment found that model of man does affect behavior. However, the interaction between value commitment and incentive characteristic is valid only within the relationship between subjectivity and feedback-seeking behavior. Moderated regression analyses show that value commitment has strong explanatory power in predicting the level of role clarity and role conflict. In particular, value commitment and measurement diversity additively affect role conflict.

VI. CONCLUSIONS

This study examines the relationship between incentives and individual performance. Prior literature emphasizes the several limitations affecting academic research on incentives. In particular, there is a lack of studies investigating mediating and moderating variables. This study tests two set of hypotheses. First, it analyzes the mediating effect of role conflict, role clarity, and feedback-seeking behavior within the relationship linking measurement diversity and subjectivity to individual performance. Second, it examines the moderating effect of value commitment on the relationship linking measurement diversity and subjectivity to role conflict, role clarity, and feedback-seeking behavior. Arguments from the psychology-rooted role theory and the cybernetics-rooted feedback-seeking theory contribute to generate

hypotheses on individual behavioral responses to incentive systems. The alternative model of man proposed by agency and stewardship theories contribute to generate hypotheses on the effect of value commitment within the relationship between incentives and individual behavior. This study empirically tests the hypotheses by studying the incentive plan of Nokia Italy. I collected proprietary data to measure incentives-related variables and conducted an internal survey to measure individual behavior-related variables. Individual performance-related variables rely on both types of data. Results provide support that more diverse set of measures and the use of subjective measures in incentive system design cause higher levels of role conflict experienced by the subordinate (H1a and H2a). High role conflict and low role clarity result in low individual performance (H3a and H3b). Results do not provide support that the use of subjectivity in performance evaluation leads to feedback-seeking behavior (H4). Multivariate analyses based on structural equation models find partial support for the mediating effect or behavioral variables. Specifically, role conflict fully mediates the relationship between measurement diversity and job satisfaction; whereas role clarity has no mediating effect within the relationship between incentives and individual performance. Moderated regression analyses find partial support for the moderating effect of value commitment within the relationship between incentives and individual behavior. Specifically, the interaction between subjectivity and value commitment explains the level of feedback-seeking behavior engaged in by the subordinate (H8). Overall these findings show the relevance of behavioral responses to incentives in explaining individual performance. This study provides robust empirical evidence that measurement diversity and subjectivity have a negative effect on both perceptual and objective individual performance variables through the role conflict these incentives characteristics cause in the subordinate. Further, the model of man operationalized as value commitment helps to explain individual behavioral responses to incentives systems.

The variety of theoretical arguments used for the hypotheses generation and the multiple-measures methodological approach used to capture the variables contributed to achieve interesting empirical findings. This indicates the importance of referring to alternatives theories to address empirical questions. Moreover, it suggests the importance of relying on multiple measures to statistically analyze empirical relationships. Future research can follow these insights and improve my study with regards to several aspects. First, this study focuses on three individual behavior-related variables. Psychology theories offer a huge variety of behavioral variables that can be potentially affected by incentive systems. Research on performance measurement and incentive should benefit from the psychology literature to find out further mediation and moderating variables within the relationship between incentives and individual performance. Moreover, my findings show significant correlations among individual behavior-related variables. For example, organizational stress operationalized as role conflict and ambiguity appear to be associated with self-regulatory behavior operationalized as feedback-seeking behavior. This suggests that incentives characteristics can generate dysfunctional behaviors that, in turn, lead individuals to develop proactive behaviors. The final result might be a positive effect on individual performance. Further research should develop empirical models taking into consideration interaction between behavioral variables. Second, although it relies on perceptual and objective variables measured through the combination of archival and survey data, my empirical research reveals the need for improvement in the variables measurement process. In particular, further research should devote more attention to measure the measurement diversity concept. As mentioned above, different measures lead to mixed and conflicting results. The measurement concentration index proposed by this study overcomes some of the limitations related to the measures used in prior literature. Future research should apply this measure in different contexts to check for its external validity. Further, this study adopts three empirical measures

for individual performances. They appear to capture different aspects of performance. Future research should cope with the relevant problem of operationalizing performance at different organizational level and within different empirical setting. Third, this study focuses on two incentives characteristics. The literature on performance measurement emphasizes a broad spectrum of elements involved in the incentive systems design. Because of data-constrained my empirical research cannot investigate the effect of group-based multipliers on individual behavior and performance. Yet, future research should study different empirical settings to examine this and other incentive characteristics. Finally, my empirical findings reveal that personal attributes play a fundamental role in the behavioral responses to incentive systems and they are highly correlated with individual performance. Performance measurement and incentive system research should benefit from the inclusion in the theoretical and empirical models of the concept of model of man. Further research should improve the operationalization of this concept.

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Appendixes

Appendix 1A. Disclosure Index Scoring Sheet and Procedure (Adapted from Botosan, *The Accounting Review, Volume 72, No. 3, July 1997*)

Disclosure Index Scoring Sheet

Company Name:		
Year end:		
Background Information:	Qualitative	Quantitative
a.A statement of corporate goals or objectives is provided.		
b.A general statement of corporate strategy is provided.		
c.Actions taken during the year to achieve the corporate goal are discussed.		
d.Planned actions to be taken in future years are discussed.		
e.A time frame for achieving corporate goals is provided.		
f.Barriers to entry are discussed.		
g.Impact of barriers to entry on current profits is discussed.		
h.Impact of barriers to entry on future profits is discussed.		
i.The competitive environment is discussed.		
j.The impact of competition on current profits is discussed.		
k.The impact of competition on future profits is discussed.		
l.A general description of the business is provided.		
m.The principal products/services produced are identified.		
n.Specific characteristics of these products/services are described.		
o.The principal markets are identified.		
p.Specific characteristics of these markets are described.		
Summary of historical results:	3 or more years	fewer than 3 years
a.Return-on-assets or ROI is provided.		
b.Return on sales (ROS) is provided.		
c.Asset turnover is provided.		
d.Return-on-equity is provided.		

	Yes	No
e.A summary of sales for at least the most recent 3 years is provided		
f.A summary of net income for at least the most recent 3 years is provided.		
g.EPS is provided		
h.(*Detailed*) information about how EPS is calculated is provided		
Segment information:		
For each line of business segment:	**Amount**	
a.Operating income		
b.Total assets		
c.Capital expenditure		
d.Sales		
For each geographical segment:	**Amount**	
e..Operating income		
f.Total assets		
g.Capital expenditure		
h.Sales		
Key non-financial statistics	**Amount**	
a.Average compensation per employee.		
b.average age of key employees		
c.Market share for the main products/services		
d.Units sold for the main products/services		
e.Unit selling price for the main products/services		
f.Growth in units sold for the main products/services		
g.Break-even sales for the main products/services		
Projected information:	Qualitative	Quantitative
a.A comparison of previous earnings projections to actual earnings is provided.		
b.A comparison of previous sales projections to actual sales is provided.		
c.The impact of opportunities available to the firm on future sales or profits is discussed.		
d.The impact of risks facing the firm on future sales or profits is discussed.		
e.A forecast of market share is provided.		
f.A cash flow projection is provided.		
g.A projection of capital expenditures is provided.		
h.A projection of R&D expenditures is provided.		

	Qualit.	Quant.	Main segm.
i. A projection of future earnings is provided.			
l. A projection of future sales is provided.			
Management discussion and analysis: (explanations for changes must be provided)	Qual. (Total group)	Qual. (Main segm.)	Quant.
a.Change in sales.			
b.Change in operating income.			
	Qual.	Quant.	
c.Change in cost of goods sold.			
d.Change in cost of goods sold as a percentage of sales.			
e.Change in gross profit.			
f.Change in gross profit as a percentage of sales.			
g.Change in selling and administrative expenses.			
h.Change in interest expense or interest income.			
i.Change in net income.			
j.Change in inventory.			
k.Change in accounts receivable.			
l.Change in capital expenditures or R&D.			
m.Change in market share.			

Disclosure Index Scoring Procedures

Background Information:

Corporate goals:

One point is awarded if the annual report includes a statement of the corporate goal or mission. One additional point is awarded if the goal is stated in quantitative terms, e.g. ROE of *X*%. Maximum points = 2.0

Statement of business strategy:

One point is awarded if the annual report includes a general statement of corporate strategy. One point is awarded if specific actions taken during the current year are outlined and one additional point is given if this includes quantitative information. One point is given if the annual report outlines specific actions to be taken in future years and one additional point is given if this includes quantitative information. One point is awarded if the annual report gives a time frame for attaining the corporate goal. Maximum points = 6.0

Competition:

One point is awarded if the annual report discusses barriers to entry. One point is awarded if the report discusses the impact of these on current profits and an additional point is given if the impact is quantified. One point is awarded if the annual report discusses the impact of barriers to entry on future firm profits and an additional point is given if this impact is quantified. One point is awarded if the report discusses the intensity of competition. One point is awarded if the impact of this on current firm profits is discussed and an additional point is given if this impact is quantified. One point is awarded if the report discusses the impact of competition on future firm profits and one additional point is given if this impact is quantified. Maximum points = 10.0

Description of the business:

One point is awarded if the annual report gives a general description of the companies business activities. Maximum points = 1.0

Principal products/services:

One point is awarded if the annual report lists the principal products/services produced. One point is awarded if the characteristics of these products are described and an additional point is given if the description includes specific, quantified information. e.g. Our machine can produce widgets 5 times faster than the competitors' similar machines. Maximum points = 3.0.

Principal markets:

One point is awarded if the report lists the principal markets that buy the firm's products. One additional point is awarded if this is quantified. e.g. % of sales to each market. One point is awarded if the annual report describes these markets and one additional point is given if this description is quantified. e.g. the size of the heavy duty truck market in 1989 was *X* units. Maximum points = 4.0

Summary of historical results:

One point is awarded if return-on-assets or ROI for 2 or fewer years is given. One additional point is awarded if return-on-assets or ROI for 3 or more years is provided. One point is awarded if ROS for 2 or fewer years is given and one additional point is given if ROS for 3 or more years is provided. One point is awarded if asset turnover for 2 or fewer years is provided. One additional point is awarded if asset turnover for 3 or more years is provided. Since any two of ROA/ROI, ROS or asset turnover is sufficient to compute the third, companies may only earn point for two of the three if all three are presented. One point is awarded if return-on-equity for 2 or fewer years is provided and one additional point is awarded if return-on-equity for 3 or more years is available.

One point is awarded if a summary of sales for at least the most recent 3 years is available. One point is awarded if a summary of net income for at least the most recent 3 years is available. One point is awarded if EPS is provided. One point is awarded if detailed information on how EPS was calculated is provided (e.g., "earnings" used, number of shares considered, etc.). Maximum points = 10.

Segment information:

Line of business segments

One point is awarded if operating income is reported for each line of business segment. One additional point is awarded if total assets are reported for each line of business segment. One additional point is awarded if capital expenditure is reported for each line of business segment. One additional point is awarded if sales are reported for each line of business segment. Maximum points = 4.

Geographical segments

One point is awarded if operating income is reported for each geographical segment. One additional point is awarded if total assets are reported for each geographical segment. One additional point is awarded if capital expenditure is reported for each geographical segment. One additional point is awarded if sales are reported for each geographical segment. Maximum points = 4.

Key non-financial statistics:

Two points are awarded for each of the 7 items listed. In some instances firms may provide one item more than once. For example, several market share figures may be present if the firm operates in more than one line of business. Only the first instance of disclosure is counted. Maximum points = 14.0

Projected information:

Comparison of last year forecast to actual:

One point is awarded if the annual report includes a comparison of a prior earnings projections to this years actual. One additional point is given if this comparison is quantified. One point is awarded if the annual report

includes a comparison of a prior sales projections to this years actual. One additional point is given if this comparison is quantified. Maximum points = 4.0

Anticipated impact of opportunities and /or risks:

Two points are awarded if the report discusses the profit or sales implications of opportunities available to the firm. One additional point is given if these implications are quantified. Two points are awarded if the report discusses the profit or sales implications of risks facing the firm. One additional point is given if these implications are quantified. Maximum points = 6.0

Projected market share:

Two points are awarded if the annual report includes a forecast of future market share and one additional point is given if this is quantified. Maximum points = 3.0

Projected cash flow:

Two points are given if the firm provides a discussion of future cash flow requirements and how they will be met. One additional point is given if these requirements are quantified. Maximum points = 3.0

Projected capital and/or research and development expenditures:

Two points are given if the annual report includes a discussion of future capital expenditures other than those already committed to. One additional point is given if the amount of planned capital expenditures is given. Two points are given if the annual report includes a discussion of future expenditures on research and development. One additional point is give in the amount of planned research and development expenditures is given. Maximum points = 6.0

Earnings and/or sales projections:

Two points are given if the firm provides a earnings projection and one additional point is given if the projection is a point estimate. One additional point is also assigned if the projection is provided for main segments. Two points are given if the firm provides a sales projection and one additional point is given if the projection is a point estimate. One additional point is also assigned if the projection is provided for main segments.

Management discussion and analysis:

One point is awarded for each item (13 items total) discussed if reasons for the change is given. One additional point per item is given if the explanation includes quantitative data. e.g. market share increased 5% over last year. Maximum points = 26.0

The procedure is the same except for sales and operating income. For these two items a firm is given only half of the points otherwise available if the report discusses the change in consolidated sales (or operating profit) and does not discuss the change at least for main segments (in a manner consistent with the breakdown provided in their segmented disclosure, if any).

Appendix 2A. QUESTIONNAIRE

1. In your subsidiary, do you use a performance measurement system to formally report performance results to the headquarters on a regular basis (hereafter called *central PMS*)?
   - Yes
   - No

2. Design and implementation of the performance measurement system were
   - Imposed by the headquarters
   - Initiated by the headquarters and shared with the subsidiary's management
   - Initiated by the subsidiary and approved by the headquarters
   - Autonomously managed by the subsidiary

3. Among the following, which performance measures are included in the *central PMS*?
   - Financial measures (e.g. Sales, ROI, etc.);
   - Customers-related measures (e.g. Customer Satisfaction, Market share, etc.);
   - Innovation-related measures (e.g. New product development rate, People training and education indicators, etc.);
   - Process-related measures (e.g. Quality indicators, Productivity, etc.).

4. On a regular basis, do you use a locally-developed performance measurement system (hereafter called *local PMS*) different from that used to report to the headquarters?
   - Yes
   - No

5. Your *local PMS* differ from the *central PMS* regarding with:
   - Its content (i.e. it contains additional and different indicators from those reported to the headquarters).
   - Its structure (i.e. information articulation and representation).
   - Its content and structure.

6. The local subsidiary's management uses the *local PMS* mainly to:
   - Communicate and monitor performance results
   - Evaluate and reward performances

7. Why do you use the *local PMS* on a regular basis, in addition to the *central PMS*?
   (**1** means that: The use of the *local PMS* in addition to the *central PMS* is absolutely not due to this reasons; **5** means that: The use of the *local PMS* in addition to the *central PMS* is mainly due to this reasons)

Reasons:	**1**	**2**	**3**	**4**	**5**
Different local accounting regulations and practices					
Need for more analyticity					
Inadequacy of central PMS to support local decision-making					
Lack of integrated information systems like Erp					

8. To what extent the measures contained in the *local PMS* influence the following subsidiary's decisions?
   (**1** means that: The influence of the *local PMS* on this subsidiary's decision is very low; **5** The influence of the *local PMS* on this subsidiary's decision is very high)

Subsidiary's strategic decisions	**1**	**2**	**3**	**4**	**5**
Pricing					
Market offer (customers)					
Market offer (products)					
After Sales-Service					
Distribution channel					
Capital Budgeting					

Production Planning					
Make or Buy					
Supply chain management					
R&D Planning and Control					
Individual Target Setting					
Responsibility Accounting					
Incentive Scheme					
Individual Performance Evaluation					
Carrier Plans					

9. The local subsidiary's management use the *central PMS* mainly to:
   - Communicate and monitor performance results
   - Evaluate and reward performances

10. To what extent the measures contained in the *central PMS* influence the following subsidiary's decisions? (**1** means that: The influence of the *central PMS* on this subsidiary's decision is very low; **5** The influence of the *central PMS* on this subsidiary's decision is very high)

Subsidiary's strategic decisions	**1**	**2**	**3**	**4**	**5**
Pricing					
Market offer (customers)					
Market offer (products)					
After Sales-Service					
Distribution channel					
Capital Budgeting					
Production Planning					
Make or Buy					
Supply chain management					
R&D Planning and Control					
Individual Target Setting					
Responsibility Accounting					
Incentive Scheme					
Individual Performance Evaluation					
Carrier Plans					

11. To what extent do the following characteristics mark subsidiary's competitive environment? (**1** means that: This characteristic does not describe subsidiary's competitive environment at all; **5** This characteristic describes subsidiary's competitive environment very well)

Characteristics	**1**	**2**	**3**	**4**	**5**
Importance of multinational customers					
Importance of multinational competitors					
Pressure for cost reduction					
Universal needs					

12. General information about the subsidiary (e.g. number of employees and industry)

Appendix 3A. The business performance measures contained in Nokia Networks Balanced scorecard (NET-BSC)

Panel A. Financials Perspective

Critical Success Factor	Business Performance Measure	Formula	Measurement Timing
Attractive investment for shareholders	Net Sales Growth %	$\left(\frac{\text{Net Sales for Quarter}}{\text{Actual Net Sales for Correspond ing Previous Year Quarter}} - 1\right) * 100$	Montly
Lean	OPEX % of Net Sales	$\frac{\text{Marketing exp.} + \text{R \& D exp.} + \text{Administra tion exp.} + \text{Goodwill depreciati on}}{\text{Net sales}} * 100$	Montly
Leading profitability	Operating Profit %	$\frac{(\text{Gross margin} - \text{Marketing exp.} - \text{R \& D exp.} - \text{Administra tion exp.} + / - \text{Total other income and exp.})}{\text{Net sales}} * 100$	Montly
High return	Gross Margin %	$\frac{\text{Net Sales} - \text{Total Cost of Sales}}{\text{Net Sales}} * 100$	Montly
Efficient use of capital	Net Working Capital Rotation Days	$182{,}5 / \frac{\text{Sum of 6 - period Net sales}}{\text{Total inventorie s \& work in progress} + \text{Current tr ade receivable s} - \text{Interest free short term debts}}$	Montly

Panel B. Customer Perspective

Critical Success Factor	Business Performance Measure	Formula	Measurement Timing
Satisfied, loyal customers	Customer Loyalty Index	Average score across 4 loyalty questions: Overall satisfaction with the products and services, Overall satisfaction in terms of value received, Likelihood to make further purchases, Likelihood to choose again if making the decision for the first time.	Semiannually
Growing market share	Market Share	$\frac{\text{NET equipment sales value (1 quarter)}}{\text{total WCDMA equipment market value (1 quarter)}} * 100$	Quarterly

Panel C. Process Perspective

Critical Success Factor	Business Performance Measure	Formula	Measurement Timing
Technology know-how	Release Slippage	$\frac{\text{(actual time between phase1 and phase5 - planned time between phase1 and phase5)}}{\text{planned time between phase1 and phase5)}} * 100$	Montly
Efficient repair	System Outage Performance	Cumulative duration of outages (min) / network element / cumulative operational time (years)	Montly
On-time product delivery	On Time Deliveries	$\frac{\text{\# of purchase order lines (OL) delivered on or before first confirmed exworks date}}{\text{Total \# of delivered purchase OL + confirmed undelivered purchase OL in the reporting period}} * 100$	Montly
On-time product delivery	Demand Planning Accuracy	$\frac{\text{Actual requested customer volume for a Period n - Demand Plan volume for a Period from Period (n -1)}}{\text{Demand Plan volume for a Period from Period (n -1)}} * 100$	Montly
Innovation & constant renewal	Open Customer Problem Reports	Number of customer reported Problem Reports that are open in the beginning of the month.	Montly
High product quality	Warranty Costs	$\frac{\text{Actual warranty cost (previous 4 Quarters)}}{\text{Net sales (previous 4 Quarters)}} * 100$	Montly
	Retrofit Costs (Total)	$\frac{\text{Actual retrofit costs (previous 4 Quarters)}}{\text{Net sales (previous 4 Quarters)}} * 100$	Montly

Panel D. People and Learning Perspective

Critical Success Factor	Business Performance Measure	Formula	Measurement Timing
Motivated, capable & empowered employees	Employee Satisfaction	1) External Status Index: NET overall employee satisfaction compared to a Global High Performance norm 2) Internal Trend Index: NET overall employee satisfaction compared to the preceding year result	Annually

Appendix 3B. Example: individual STIP and variables construction

(i)	**Nokia Identification Number**	10X003X3						
(ii)	**Start- and End-date of the incentive plan**	01.01.2005-30.06.2005						
(iii)	**Business Group**	Networks						
(iv)	**Business Team**	NET EMEA						
(v)	**Organizational Unit**	NET CMO EMEA Care Pool Mgmt Team IT						
(vi)	**Job-grade**	9						
(vii)	**Annual Cash Bonus at target level**	12,5						
(viii)	**Objective Description**	**(ix) Objective Weight**	**(x) Minimum**	**Target**	**Maximum**	**(xi) Result**	**(xii) Score**	**(xiii) Incentive**
	1) Geog. Area 2 (EMEA) NET Sales	15	0,9	1	1,1	1	100	1,88
	2) Geog. Area 2 (EMEA) Contribution	15	0,9	1	1,15	1,09	130	2,44
	3) NET EMEA Customer Loyalty Index	10	7,2	7,4	7,6	7,2	1	0,01
	4) Customer X NET SALES + Gross margin	20	103,5	139,4	153,3	166,54	150	3,75
	5) Personal objective	20	1	2	3	3	150	3,75
	6) Open Case Reduction	20	140	202	262	264	150	3,75
(xiv)	**Annual Individual Achievement**	15,58						
(xv)	**Business Team Multiplier**	1,06						
(xvi)	**Annual Individual Adjusted Achievement**	16,51						
(xvii)	**Payable**	8,19						
(xviii)	**Solid Line Manager Identification Number**	202XX63						

STIP-based measures entered into the analysis: # of measures included in STIP (NMEAS); Measurement Concentration Index (MCI); # of subjective measures (NSUBJ); weight put on subjective performance measure (SUBJ); weighted individual performance (WINPERF).

$NMEAS = 6$

$MCI = (15\%)^2 + (15\%)^2 + (10\%)^2 + (20)^2 + (20)^2 + (20)^2 = 17,5\%$

$NSUBJ = 1$

$SUBJ = 20\%$

$WINPERF = 1,5 * 20\% = 30\%$

Appendix 3c. Dataset information

The private dataset provided by the company reports for each STIP the information described in the following table. The overall 3-period dataset has 18 columns (i.e. types of information) and 7426 rows (i.e. performance targets). My research paper focuses on the most recent available period (i.e. first semester of 2005). The dataset used for my research has 18 columns and 2214 rows.

	Information	Description
(i)	**Nokia Identification Number**	Personal identification code of the employee
(ii)	**Start- and End-date of the incentive plan**	STIP period
(iii)	**Business Group**	Networks, Multimedia, Enterprise Solutions
(iv)	**Business Team**	Vertical dimension of the organizational structure
(v)	**Organizational Unit**	Functional Department
(vi)	**Job-grade**	Organizational position
(vii)	**Annual Cash Bonus at target level**	Annual cash bonus percentage of the salary at target level
(viii)	**Objective Description**	Performance target to achieve
(ix)	**Objective Weight**	Weight put on the performance target
(x)	**Minimum, Target, and Maximum**	Extremes of target achievement scale
(xi)	**Result**	Actual performance measure
(xii)	**Score**	Target achievement rate for each performance measure
(xiii)	**Incentive**	Percentage of weighted target achievement with respect to the annual cash bonus at target level
(xiv)	**Annual Individual Achievement**	Overall weighted average target achievement
(xv)	**Business Team Multiplier**	Business Group multiplier
(xvi)	**Annual Individual Adjusted Achievement**	Annual Individual Achievement weighted by the Business Team Multiplier
(xvii)	**Payable**	Annual Individual Adjusted Achievement weighted by the number of days included in the STIP
(xviii)	**Solid Line Manager Identification Number**	Personal identification code of the target setter

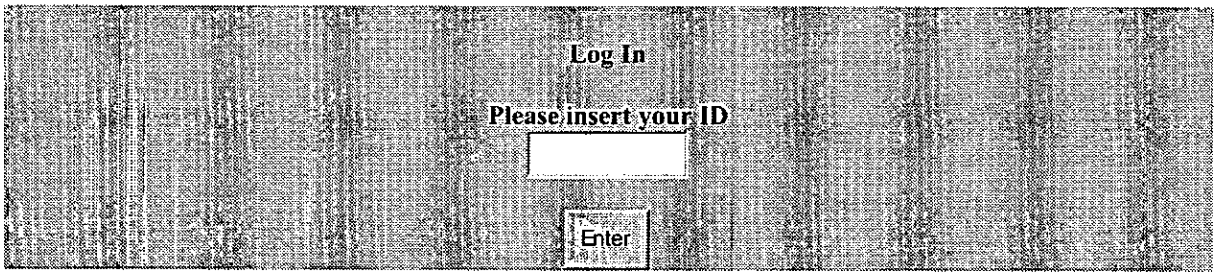
Appendix 3D. The questionnaire instrument

INSTRUCTIONS

CONFIDENTIALITY:
Results will be reported at an aggregate level so that it will be impossible to identify individual respondents.

GETTING STARTED:
This is a very short questionnaire. Completing it takes about 7 minutes. In all questions you will simply be asked to express your opinion on a statement. There are no "right" or "wrong" answers to any of the questions asked. It is very important that you answer every single question.

Once you start answering, you are required to finish filling in the questionnaire.
Thank you very much for your collaboration!



QUESTION 1

	Well Below average			Average			Well Above average
	1	2	3	4	5	6	7
1. How do you rate your overall performance?	☐	☐	☐	☐	☐	☐	☐

QUESTION 2

2. In order to find out for yourself how well you personally are performing in your present job, how frequently do you	Never 1	2	3	Sometimes 4	5	6	Always 7
observe what performance behaviours your superiors reward and use this as feedback on your own performance?	☐	☐	☐	☐	☐	☐	☐
compare yourself with employees at your level in the organization?	☐	☐	☐	☐	☐	☐	☐
pay attention to how your superiors act towards you in order to understand how they perceive and evaluate your performance?	☐	☐	☐	☐	☐	☐	☐
observe the characteristics of employees rewarded by superiors and use this information?	☐	☐	☐	☐	☐	☐	☐
seek information from your colleagues about your work performance?	☐	☐	☐	☐	☐	☐	☐
seek feedback from your superiors about your work performance?	☐	☐	☐	☐	☐	☐	☐

QUESTION 3

3. Please, indicate your opinion with regard to the following statements.	False 1	2	3	Neither False nor True 4	5	6	True 7
For me, this is one of the best of all organizations for which to work.	☐	☐	☐	☐	☐	☐	☐
I am proud to tell others that I am part of this organization	☐	☐	☐	☐	☐	☐	☐
I usually agree with this organization's policies on important personnel matters.	☐	☐	☐	☐	☐	☐	☐
I talk up this organization to my friends as a good organization to work for.	☐	☐	☐	☐	☐	☐	☐
I care about the fate of this organization.	☐	☐	☐	☐	☐	☐	☐
I find that my values and the organization's values are similar.	☐	☐	☐	☐	☐	☐	☐
I am glad I chose this organization to work for over others I was considering at the time I joined.	☐	☐	☐	☐	☐	☐	☐
This organization inspires the best in me in the way of job performance.	☐	☐	☐	☐	☐	☐	☐
I am willing to put in great deal of effort beyond that normally expected in order to help this organization be successful.	☐	☐	☐	☐	☐	☐	☐

QUESTION 4

4. How frequently do you feel as follows?	Never 1	2	3	Sometimes 4	5	6	Always 7
I have enough time to complete my job.	☐	☐	☐	☐	☐	☐	☐
I feel certain about how much authority I have.	☐	☐	☐	☐	☐	☐	☐
I perform tasks that are too easy or boring.	☐	☐	☐	☐	☐	☐	☐
I have clear, planned goals and objectives for my job.	☐	☐	☐	☐	☐	☐	☐
I have to do things that should be done differently.	☐	☐	☐	☐	☐	☐	☐
Lack of policies and guidelines to help me.	☐	☐	☐	☐	☐	☐	☐
I am able to act the same regardless of the group I am with.	☐	☐	☐	☐	☐	☐	☐
I am corrected or rewarded when I really don't expect it.	☐	☐	☐	☐	☐	☐	☐
I work under incompatible policies and guidelines.	☐	☐	☐	☐	☐	☐	☐
I know that I have divided my time properly.	☐	☐	☐	☐	☐	☐	☐
I receive an assignment without the manpower to complete it.	☐	☐	☐	☐	☐	☐	☐
I know what my responsibilities are.	☐	☐	☐	☐	☐	☐	☐
I have to buck a rule or policy in order to carry out an assignment.	☐	☐	☐	☐	☐	☐	☐
I have to "feel my way" in performing my duties.	☐	☐	☐	☐	☐	☐	☐
I receive assignments which are within my training and capability.	☐	☐	☐	☐	☐	☐	☐
I feel certain how I will be evaluated for a raise or promotion.	☐	☐	☐	☐	☐	☐	☐
I have just the right amount of work to do.	☐	☐	☐	☐	☐	☐	☐
I know I have divided my time properly.	☐	☐	☐	☐	☐	☐	☐
I work with two or more groups who operate quite differently.	☐	☐	☐	☐	☐	☐	☐
I know exactly what is expected of me.	☐	☐	☐	☐	☐	☐	☐
I receive incompatible requests from two or more people.	☐	☐	☐	☐	☐	☐	☐
I am uncertain as to how my job is linked.	☐	☐	☐	☐	☐	☐	☐
I do things that are apt to be accepted by one person and not accepted by others.	☐	☐	☐	☐	☐	☐	☐

I receive an assignment without adequate resources and materials to execute it.	
Explanation is clear on what has to be done.	
I work on unnecessary thing.	
I have to work under vague directives or orders.	
I perform work that suites my values.	
I do not know if my work will be acceptable to my boss.	

QUESTION 5

5. Ask yourself: How satisfied am I with this aspect of my job?	Not Satisfied 1	2	3	4	5	6	Satisfied / Extremely Satisfied 7
Being able to keep busy all the time.							
The chance to work alone on the job.							
The chance to do different things from time to time.							
The chance to be "somebody" in the community.							
The way my boss handles his/her workers.							
The competence of my supervisor in making decisions.							
Being able to do things that don't go against my conscience.							
The way my job provides for steady employment.							
The chance to do things for other people.							
The chance to tell people what to do.							
The chance to do something that makes use of my abilities.							
The way company policies are put into practice.							
My pay and the amount of work I do.							
The chances for advancement on this job.							
The freedom to use my own judgment.							
The chance to try my own methods of doing the job.							
The working conditions.							
The way my co-workers get along with each other.							

The praise I get for doing a good job.	○ ○ ○ ○ ○ ○ ○
The feeling of accomplishment I get from the job.	○ ○ ○ ○ ○ ○ ○

Please, before pressing the key "Submit", control that all the answer are compiled.

Submit

Appendix 3E. Operationalization

Construct	Variable	Measure	Instrument
Incentive systems	Measurement diversity	Concentration index of weights on different perspectives (MCI) Number of measures included in the incentive plan (NMEAS)	Archival data (STIP dataset)
	Subjectivity	Weights on performance measures assessed subjectively (SUBJ) Number of subjective performance measures included in the incentive plan (NSUBJ)	Archival data (STIP dataset)
Organizational stress	Role conflict	One 15-item question (see odd items in question 4, Appendix 3B) (ROLCON)	Rizzo, House, and Lirtzman (1970)
	Role ambiguity	One 15-item question (see even items in question 4, Appendix 3B) (ROLCLA)	Rizzo, House, and Lirtzman (1970)
Self-regulatory behavior	Feedback-seeking behavior through inquiry	One 2-item question (see last two items in question 2, Appendix 3B) (FSBINQ)	Ashford (1986)
	Feedback-seeking behavior through inquiry	One 4-item question (see first four items in question 2, Appendix 3B) (FSBMON)	Ashford (1986)
Model-of-man	Value commitment	One 9-item question (see question 3, Appendix 3B) (VALCOM)	Mayer and Schoorman (1992)
Individual performance	Self-reported performance	One item question (see question 1, Appendix B) (SPERF)	Mahoney, Jerdee and Carroll (1963)
	Job-satisfaction	One 20-item question (see question 5, Appendix 3B) (JOBSAT)	Minnesota Satisfaction Questionnaire
	Objective performance	Weighted target achievement score (WINPERF)	Archival Data

Appendix 3F. Exploratory factor analysis's assumptions validation.

Assumption	Description	Test	Result
No selection bias	The exclusion of relevant variables and the inclusion of irrelevant variables in the correlation matrix being factored will affect, often substantially, the factors which are uncovered.	No item of the questionnaire was excluded	No selection bias
No outliers	Outliers can impact correlations heavily and thus distort factor analysis.	Mahalanobis Distance: 1 Case has a probability of any arbitrary squared Mahalanobis distance exceeding the value obtained for that particular case smaller than 0.05 (i.e. p=0.047).	Given that the probability is very close to the conventional cut-off value and that the Mahalanobis distance is not so different from the others cases, no outlier is excluded
Interval data	Interval data are assumed. The result of using ordinal data is that the factors may be that much harder to interpret.	All the instruments are multi-item questions with a 7-point scale and with three anchored values	Data appropriateness
Normality	PCF and PFA have no distributional assumptions. In CFA, nonnormality does not affect maximum likelihood estimates, but can inflate standard errors rendering significance tests invalid	Bootstrap resampling for CFA	
Orthogonality	The unique factors should be uncorrelated with each other or with the common factors.	Promax Rotation was used for the overall PFA and for the PCF on instruments supposed to capture more than one factors. Promax is an oblique rotation technique so that factors are not constrained to be orthogonal	Control for orthogonality
Underlying dimensions	Factor analysis cannot create valid dimensions (factors) if none exist in the input data. The inclusion of multiple definitionally-similar variables representing essentially the same data will lead to tautological results	Adoption of established instruments developed in academic literature, with no modifications in the wording.	High Cronbach's Alphas for each of the expected factors
Intercorrelations	Applying factor analysis to a correlation matrix with only low intercorrelations will require for solution nearly as many principal components as there are original variables, thereby defeating the data reduction purposes of factor analysis.	Kaiser-Meyer-Olkin (KMO) provides a mean to assess the extent to which the indicators of a construct belong together (a measure above 0.60 is tolerable).	KMO = 0.7241
Interpretations	Factor interpretations and labels must have face validity and/or be rooted in theory	Adoption of instruments developed in academic literature and pre-test to assess clarity of items.	Good face validity
Adequate sample size	There is no scientific answer to this question, and methodologists differ.	At a minimum, there must be more cases than factors. Kaiser-Meyer-Olkin (KMO) serves also as a sampling adequacy measure	7392 (112*66) cases for 6 factors. KMO = 0.7241

Appendix 3G. Variables construction procedure

	Instrument	STEP 1	STEP 2	STEP 3	STEP 4
FIRST ROUND	All 4 Instruments	16 underlying factors versus 6 expected factors. 6 factors explain 50% of the total variance.			
	Feedback-seeking Behavior (FBS)	Very Good representation of 2 expected factors	2 underlying factors explaining 68% of the total variance		
		Feedback-seeking behavior through monitoring (FSBMON)	Feedback seeking-behavior through monitoring (FSBMON): 4 items (those expected)		
		Feedback-seeking behavior through inquiry(FSBINQ)	Feedback seeking-behavior through inquiry(FSBINQ): 2 items (those expected)		
	Value Commitment (VALCOM)	Good representation of 1 expected factors. Value Commitment (VALCOM)			
			Value Commitment (VALCOM): 2 underlying factors versus 1 expected	Exclusion of 2 items (i.e., C9)	
	Role dysfunctions (ROLE)	Role Conflict (ROLCON): 7 underlying factors versus 1 expected factor. Role Clarity (ROLCLA): 6 underlying factors versus 1 expected factor	7 explaining factors versus 2 expected. 2 factors explain 38% of the total variance	Replication of Rizzo's results. Exclusion of 15 items	
	Job-Satisfaction (JOBSAT)	Job-Satisfaction (JOBSAT): 6 underlying factors versus 1 expected factor	4 underlying factors versus 1 expected. 1 factors explain 21% of the total variance	Exclusion of 2 items (i.e. E1,E2)	

	Instrument	STEP 1	STEP 2	STEP 3	STEP 4
	All 4 Instruments	10 explaining factors versus 6 expected. 6 factors explain 54% of the total variance			
	Feedback-seeking Behavior (FBS)	Very Good representation of 2 expected factors Feedback-seeking behavior through monitoring (FSBMON) Feedback-seeking behavior through inquiry(FSBINQ)			
SECOND ROUND	Value Commitment (VALCOM)	Good representation of 1 expected factors. Value Commitment (VALCOM): 1 item loading to a different factor	1 explaining factor as expected. 1 factor explains 65% of the total variance	Exclusion of 1 item (i.e., C9)	
	Role dysfunctions (ROLE)	Very Good representation of 2 expected factors Role Conflict (ROLCON) Role Clarity (ROLCLA)			
	Job-Satisfaction (JOBSAT)	Bad representation of 2 expected factors. Job-Satisfaction (JOBSAT): 4 underlying factors versus 1 expected factor	3 explaining factors versus 1 expected. 1 factor explains 23% of the total variance	Exclusion of 1 item (i.e., C8)	

	Instrument	STEP 1	STEP 2	STEP 3	STEP 4
	All 4 Instruments	9 explaining factors versus 6 expected. 6 factors explain 54% of the total variance.			CFA: CMIN/dF=1.840. No item loads below 0.40
THIRD ROUND	Feedback-seeking Behavior (FBS)	Very Good representation of 2 expected factors Feedback-seeking behavior through monitoring (FSBMON): FACTOR 7 Feedback-seeking behavior through inquiry(FSBINQ): FACTOR 8			
	Value Commitment (VALCOM)	Very good representation of 1 expected factors. Value Commitment (VALCOM)			
	Role dysfunctions (ROLE)	Very Good representation of 2 expected factors Role Conflict (ROLCON) Role Ambiguity (ROLCLA)			
	Job-Satisfaction (JOBSAT)	Good representation of 1 expected factor. Bad representation of 1 expected factor (intrinsic job-satisfaction).	3 explaining factors versus 1 expected. 1 factor explains 23% of the total variance	Review of multidimensionality analysis reported in previous accounting studies	