African Journal of
Business Management

About AJBM

The African Journal of Business Management (AJBM) is a peer reviewed open access journal. The journal commenced publication in February 2007 as a monthly publication. The scope of the journal covers all areas of business and management research. The journal welcomes submission of full-length research articles, short communications and review articles. In addition, the journal also welcomes letters and commentaries to the editor. Please see Instruction for Authors for complete details. The journal is currently published monthly. Please see journal archive for all past issues or see all published articles

Indexing

CNKI Scholar, Economics and Business Studies Database, Google Scholar, IBZ Online Database Microsoft Academic, ResearchGate

Open Access Policy

Open Access is a publication model that enables the dissemination of research articles to the global community without any form of restriction. All articles published under open access can be accessed by anyone with internet connection.

The African Journal of Business Management is an Open Access journal. Abstracts and full texts of all articles published in this journal are freely accessible to everyone immediately after publication without any form of restriction.

Article License

All articles published by the African Journal of Business Management are licensed under the Creative Commons Attribution 4.0 International License. This permits anyone to copy, redistribute, remix, transmit and adapt the work provided the original work and source is appropriately cited. Citation should include the article's DOI. The article license is displayed both on the abstract page and the full-text PDF of each article.

Memberships and Standards

OPEN ACCESS

Academic Journals strongly supports the Open Access initiative. Abstracts and full texts of all articles published by Academic Journals are freely accessible to everyone immediately after publication.

creative commons

All articles published by Academic Journals are licensed under the Creative Commons Attribution 4.0 International License (CC BY 4.0). This permits anyone to copy, redistribute, remix, transmit and adapt the work provided the original work and source is appropriately cited.

Crossref

Crossref is an association of scholarly publishers that developed Digital Object Identification (DOI) system for the unique identification published materials. Academic Journals is a member of Crossref and uses the DOI system. All articles published by Academic Journals are issued DOI.

Similarity Check powered by iThenticate is an initiative started by CrossRef to help its members actively engage in efforts to prevent scholarly and professional plagiarism. Academic Journals is a member of Similarity Check.

CrossRef Cited-by Linking (formerly Forward Linking) is a service that allows you to discover how your publications are being cited and to incorporate that information into your online publication platform. Academic Journals is a member of CrossRef Cited-by.

<idpf>

Academic Journals is a member of the International Digital Publishing Forum (IDPF).
The IDPF is the global trade and standards organization dedicated to the development and promotion of electronic publishing and content consumption.

Contact

Editorial Office:	ajbm@academicjournals.org
Help Desk:	helpdesk@academicjournals.org
Website:	http://www.academicjournals.org/journal/AJBM
Submit manuscript online	http://ms.academicjournals.org

Dr. V. Mahalakshmi
Panimalar Engineering College
7-A,CID Quarters, Mandaveli,Chennai-600028,
Tamilnadu,
India

Dr. Ata Allah Taleizadeh
Iran University of Science and Technology
Faculty of Industrial Engineering,
Iran University of Science and Technology,
Narmak, Tehran,
Iran.

Dr. José M. Merigó
University of Barcelona
Department of Business Administration, Av.
Diagonal 690,
Spain.

Dr. Anton Sorin Gabriel
Carol I Boulevard, No. 11, 700506, Iasi,
Alexandru Ioan Cuza University Iasi,
Romania.

Dr. Aura Emanuela Domil
31 Horia Creanga, zip code 300253, Timisoara
West University from Timisoara
Faculty of Economics and Business
Administration,
Romania.

Dr. Guowei Hua
NO. 3 Shangyuancun, Haidian District,
Beijing 100044,
School of Economics and Management,
Beijing Jiaotong University,
China.

Dr. Mehdi Toloo
Technical University of Ostrava
Ostrava,
Czech Republic.

Dr. Surendar Singh
Department of Management Studies,
Invertis University
Invertis village, Bareilly -
Lucknow Highway, N.H.-24, Bareilly
(U.P.) 243 123,
India.

Dr. Colin J. Butler
University of Greenwich
Business School, University of Greenwich,
Greenwich, SE10 9LS, London,
UK.

Dr. Colin J. Butler
University of Greenwich
Business School, University of Greenwich,
Greenwich, SE10 9LS, London,
UK.

Prof. Dev Tewari
School of Economics and Finance
Westville Campus University of Kwa-Zulu
Natal (UKZN) Durban, 4001,
South Africa.

Dr. Paloma Bernal Turnes
Universidad Rey Juan Carlos
Dpto. Economía de la Empresa
Pº de los Artilleros s/n
Edif. Departamental, Desp. 2101
28032 Madrid,
España.

Dr. Jurandir Peinado
Universidade Positivo
Rua Silveira Peixoto, 306
Zip 80240-120 Curitiba – PR –
Brazil.

Dr. Abdelaziz Hakimi
Management,
Faculty of Law, Economics and Management of
Jendouba,
Tunisia.

Dr. Henrique Reis
Economics and Management,
Higher School of Management - IPS,
Portugal.

Dr. Obed Ligate
Independent researcher,
University of North America (Alumni),
United States.

Dr. Roberto Bruni
Department of Economics and Law,
University of Cassino and Southern Lazio,
Italy.

Dr. Svetlana Saksonova
Faculty of Management and Economics,
University of Latvia,
Latvia.

Dr. Gaetano Matonti
Faculty of Management and Economics,
University of Latvia,
Latvia.

Table of Content

AJ ACADEMIC JOURNALS
expand your knowledge

African Journal of Business Management

Full Length Research Paper

Health service in Brazilian private and public hospitals: Budgetary participation, feedback and performance from clinical managers' perception

Gisele Cristina dos Santos[1*], Carlos Alberto Grespan Bonacim[2] and Luiz Eduardo Gaio[3]

[1]School of Economics, Business Administration and Accounting, Faculty of Ribeirão Preto, University of Sao Paulo, Brazil.
[2]Department of Accounting, Faculty of Ribeirão Preto School of Economics, University of Sao Paulo, Brazil.
[3]Department of Business Administration, Faculty of Business Administration, Universidade de Campinas, Brazil.

Budgetary control is pointed as a managerial mechanism suitable for cost reduction and control as well as performance evaluation of institutions. In health organizations, budget is used for funds allocation, coordination, control and communication of the institutions' strategies. In this context, the research will observe the phenomenon of budgetary process from the perspective of Health Service managers of public and private hospitals, called "clinical managers". It aims to check whether there is a relation between the budgetary process characteristics and the budgetary execution performance. Three hypotheses were tested for the analysis of the following budget characteristic, budgetary participation, budgetary feedback and budgetary evaluation. This theoretical research model is going to be analyzed using the structural equation method. The study evaluates if there is a relationship between the budget process characteristic and the budget execution indicator, called meeting the budget. The snowball sample technique was used to sample the research respondents. Thirty three clinical managers were used as sample for the study. The hypotheses were tested using the Smart Pls software. Only Hypothesis 3 was supported statistically, asserting that there is a positive and significant relationship between the budgetary evaluation characteristic and the budget execution performance. These evidences indicate that health service managers recognize the budgetary evaluation as a predominant feature which interferes with the budgetary execution of their field due to the liability on the result of such execution and the possibility of using this metrics in performance evaluation.

Key words: Budgetary control, budget, budgetary evaluation, performance.

INTRODUCTION

The need to increase managerial control in hospitals in response to the pressure for cost reduction and efficiency of hospitals has led to the development of several studies on health. Examples include those of Abernethy and Stoelwinder (1991), Jacobs (1998), Aidemark (2001) and Lu (2011), which point the budgetary control as a suitable

managerial mechanism used for the reduction and control of cost and performance evaluation of a hospital. Specifically, in the health sector, budget is a tool that is used for funds allocation, coordination, control and communication of health institutions' strategies, since there is a growing search for cost reduction and efficiency due to the shortage of funds present in this sector (Zucchi et al., 2000).

Hospital institution efficiency is translated in the way the funds available are used to produce treatments and other clinical and non-clinical services. The inappropriate use of these funds prevents efficient service provision, jeopardizes the quality of service and results in higher costs (La Forgia and Couttolenc, 2009). The control environment is the mainstay of the operational support for controlling the activities of any organization, and the healthcare sector is not an exception (Imoniana and Silva, 2019).

In the health sector, the budget process can be influenced by the complexity of the peculiar health service characteristics, such as the difficulty in measuring the service quality because of the intangibility, the heterogeneity of the procedures, the inseparability of the service production and consumption, besides the tension existing between the clinical and administrative areas of the hospital when establishing the goals (Pettersen, 1995; Silva et al., 2009).

In the environment characteristics, the difficulty to measure the agents'[1] effort is greater due to the tension between the clinical and administrative areas. This is because the clinical one, due to the complexity of the service characteristics, will tend to protect itself from the lack of funds. This would induce goals which will bring more funds for the accomplishment of the procedures to care for the patients, while the administrative area will seek the funds allocation that reflects the efficiency for the institution.

Putting forward the above idea, in the scope of the Managerial Control Systems, the budgeting tool is inserted, since it consists of both a management plan, represented by the quantification of the economic and financial objectives to be reached by an organization, expressed via the formalization of projections of revenues and expenditures, and in a process, comprising the relationships between the elements of the control system of an organization, such as performance indicators, incentives and control (Merchant and Manzoni, 1989; Lunkes, 2009).

Thus, in this budget process, besides the managers being inserted into the definition of the budgetary goals which will set this plan of expenditure projections of their sectors/units, they are also part of the process that comprises the relationships of the institution control

system, such as the budget execution performance evaluation, which may be tied to the system of benefits and remuneration. From the studies of Kenis (1979) and Lu (2011), it is intended to study the budget system characteristics – budgetary participation, budgetary feedback and budgetary evaluation – in which the managers of the Health Service, called "clinical managers" in this study, are involved; analyzing which of these characteristics influence the budget execution performances of these managers´ unit/area. Therefore, the aim of this study is to analyze the relationship of the budget process characteristics with the effectiveness of budget execution in the view of "clinical managers".

The structure of this paper comprises the theoretical development on the budget and its applicability in the Health context, the methodology applied and the results evaluated from the use of the Structural Equation Models, followed by the final considerations and references.

LITERATURE REVIEW

Managerial control and budget economic approach

In the context of the firm, contractual approach, which has the allocation of decision-making rights as the main idea, is established when the Principal (owner) delegates the power of decision to an agent (manager) who must act on behalf of himself, that is, aligned to his interests. The agency relationship can be defined as an agreement under which the Principal uses another person (agent) to do, on his behalf, a service which implies the delegation of some decision-making power to the agent (Jensen and Meckling, 1976). Since the agent and the principal are maximizers of their utility function, the agent will not always act according to the principal's interest, generating misalignment of interest and agency cost. These costs refer to the agent´s monitoring costs to break the information asymmetry, aiming at limiting the agent´s irregular activities; cost of generating benefits or outlining the behavior (bonding cost) and the residual losses due to the monitoring inefficiency (Jensen and Meckling, 1976).

The agents participate in a relationship with the firm to increase their utility function, given the remuneration and the benefits received to keep them interested and acting on behalf of the principal; however, the agent´s individual behavior enhances moral hazard, since the agent's effort is not observable. The existence of moral hazard problems may have a significant effect on the type of matching between principals and agents that we may observe at equilibrium, compared to the matching that would happen if incentive problems were absent. Under moral hazard, the gains that the participants get when they match are different, and that affects the equilibrium outcome (Macho-Stadler and Pérez-Castrillo, 2020).

Since the agent´s effort is not observable, the benefit

---

[1] The word "agent" refers to the agency relationship, in which the Principal (owner) delegates the agent (manager) the right to act on his behalf. The Principal delegates decisions to the agent, hoping that the agent acts in accordance with his interests (Jensen & Meckling, 1976).

problem arises because the firm will have to design contracts which bind the contract result – the proxy used to measure his effort – with a reward system so that the agent reveals his information on the non-observable behavior (Gibbons and Roberts, 2013). In this context, the Controllership deals with the management artifacts - such as the budget and its elaboration process, which will originate the relevant information for the performance and benefits measurement system, being a part of the organization control system. The budget refers to a plan the organization uses to obtain and consume financial and non-financial resources during a period of time (Lu, 2011). It can be used as a management mechanism, as a permit, so that the managers spend a certain amount of funds as a way of planning and control, as a tool to influence the manager's behavior and financially motivate his decision-making practices and as a manager's performance judgement and remuneration calculation (Macinati, 2010). The budget preparation process, in many organizations, is coordinated by the controller, or a budget committee which addresses the high management. This committee is responsible for issuing the policies and guidelines which regulate the budget preparation and which will have the company strategic planning as basis (Anthony and Govindarajan, 2008).

These guidelines will be distributed to all of those who are involved in the process, usually to the managers of the responsibility centers, so that, along with their staff, they develop the budget of the unit/division which is under their responsibility (Anthony and Govindarajan, 2008). In this budget interaction process which involves funds distribution, goal establishment, performance and motivation, behavioral aspects of the budget must be considered (Atkinson et al., 2011). The participation of the agents involved in budget planning is a relevant aspect of this process, and the budgeting goals may be related to benefits and compensation systems, which can influence the agents´ behavior (Atkinson et al., 2011).

In the Economy view, budget is seen as a component of the Managerial Accounting system, and it is important in the coordination of activities and benefits within the organization (Covaleski et al., 2007). The budget is analyzed as a decision-making facilitator due to its role in the performance and benefit evaluation system, besides promoting a communication process between the managers and employees, anticipating decisions by facts which are already known by the employees and also by the participation in the budget process (Covaleski et al., 2007). Thus, the study focus in this perspective is in the budget arrangements which maximize the Principal´s and agents´ interests, investigating the use of the budget practices (such as the setting of budget goals, participative budget, reward system based on budget), besides analyzing how the choices of budgeting practices produce outcomes, such as the individual well-being, the performance of the organization and budgetary slack (Covaleski et al., 2007).

Budget process and the Health Service

Studies in the field of health portray the budgetary control as managerial mechanism suitable both for the reduction, and the cost control in the clinical area, besides being able to be used in the evaluation processes and performance improvement (Abernethy and Stoelwinder, 1991; Jacobs, 1998; Aidemark, 2001; Lu, 2011).

The budget refers to a plan the organization uses to obtain and consume financial and non-financial resources during a period of time (Lu, 2011). It can be used as a management mechanism, as a permit to enable the managers spend a certain amount of funds, for planning and control, as a tool to influence the manager's behavior and financially motivate his decision-making practices and as a manager's performance judgement and remuneration calculation (Macinati, 2010).

King et al. (2010) point that the budget is considered one of the most important managerial control system in the organizations, which keeps on receiving significant attention in literature and is applied in several business types, since there is not only one budget type which is suitable for all the organizations, but it can be contingent on unique features of each one of them. The managerial control systems, through their tools, such as budget, must be designed and developed considering the organizational context of both the institutions and the professional involved in this process, mainly the Health sector, because, according to Pizzini (2006), the hospital constitutes complex institutions whose clinical and patient care practices have high uncertainty level for the task.

The Health organizations have started to adopt suitable management tools so that the managers could carry out the management of these scarce funds, aiming the continuous search for efficiency and effectiveness of practices (Bonacim and Araujo, 2010; Dallora and Foster, 2008). The managerial efficiency and effectiveness surely involve the cost matter, since the hospital excellence requires efficiency in cost associated with quality of the service granted and the consequent satisfaction of the patient (Bonacim and Araujo, 2010). The system of determination and cost control takes an important role in these institutions, but in the Health scope, the cost management has quite unique characteristics, made of different types of procedures, practices and numberless projects carried out within a single organization, making the cost determination a challenging task (Almeida et al., 2009).

The budget was also pointed as a tool for performance improvement in hospitals since it would perfect the processes, promote cost efficiency without sacrificing the quality of the institution service and the funds maximization, besides facilitating the decision-making process, according to Abernethy and Guthrie´s (1994) previous studies, corroborated by Hammad et al. (2010).

Kenis (1979) examined some effects of the budgeting goal characteristics, such as feedback, clearness,

difficulty and the evaluation of the attitudes related to work development – satisfaction, involvement and tension, in the attitudes related to the budget. According to this paper, the budget characteristics have an important role in the improvement of the managers attitudes towards the budgets, since the results revealed that the budgetary participation tends to raise the managers´ budgetary performance and that there is positive relationship between the budget, motivation and performance characteristics.

Li et al. (2010) also examined the effects of budgetary goal characteristics, budget goal clarity and budget goal difficulty, on managerial attitudes and performance in the budgeting process. Lu´s (2011) studies had Kenis´s (1979) research as basis, however it was applied to budget managers of public hospitals in China, and the unit service managers as clinical departments, Nursing, auxiliary and administrative departments, seeking to investigate the budgetary perceptions (attitude, tendency to budgetary slack and motivation) of the members and the influence of these perceptions on the hospital performance.

Lu (2011) sought to integrate the budgetary perceptions as intermediate variables between the characteristics of the budgetary control system (budgetary participation, feedback, budgetary goal evaluation, clearness and budgetary goal difficulty) and the performance, besides helping to look into those issues in public hospitals.

Regarding the goal clearness and the budgetary participations, Kenis (1979) identified that they are positively correlated and that the difficulty level of the budgetary goal demonstrated adverse effects in attitude and budgetary performance. The budgetary participation is defined as the extension in which the managers participate in the budget preparation and influence the budgetary goals under the responsibility of their centers. The budgetary feedback is the level in which the budgetary goals have been reached (Kenis, 1979).

Macinati et al. (2016) studied the effects of budgetary participation on medical manager job performance mediated by managerial job engagement and managerial self-efficacy. The relationship between budgetary participation and job performance is fully mediated by the two mediating variables which act jointly in the participation-job performance link. The effective budget, according to Lu (2011), would motivate the members to work in pursuit of the organization objectives, involving the participation of the members (managers and subordinates) in the budget preparation process, since the managers would obtain detailed information of each department´s daily operations.

The Health Service managers ´participation would be essential, since these professionals make up an important decision-making level in funds allocation, when they decide on the priorities of their services and which funds will be used, besides being pointed by the World Health Organization as the ones with the greatest potential in the Health area to ensure profitable assistance (Francisco and Castilho, 2002; De Oliveira et al., 2014). These Health Service managers are defined in this study as "clinical managers", to whom a decision-making level regarding the setting of budgetary goals is assigned (Macinati and Rizzo, 2014). According to these authors, these doctors' ("clinical managers") decision-making process is a key factor in the matter of funds consumption of the hospitals and their involvement in this process is seen as critical for the efficiency and performance of the institution.

Due to the evidences presented, the budgetary participation of health service managers of public and private hospitals can influence the definition of budgetary goals, whose reflex will be the most suitable budgetary execution, since the budget will be legitimized by these managers involved in the process. Thus, the following hypothesis is set:

H1: When the Health Service managers´ participation in the budget process is high, the Budget Execution tends to be greater- Meeting the budget.
Budgetary feedback is the level in which the budgetary goals have been reached (Kenis, 1979). According to Lu (2011), budgetary feedback refers to the level a department manager receives information on the accomplishment of budgetary goals, helping the managers, through the analysis of the information received about the budgetary execution, to check and adjust the expected performance, and also help setting the future budget. This study's results demonstrated that when the budgetary feedback and participation are high, the managers' motivation and attitude will be high and the tendency to budget slack will be low. When the level of budgetary motivation and attitude are high, the performance will be high as well.
Formally, there is the following hypothesis:

H2: When the feedback received by the Health Service managers in the budget process is high, the Budget Execution Indicator tends to be greater - *Meeting the budget.*

As defined by Kenis (1979), budgetary evaluation refers to the extension to which the budgetary variations are reported to those responsible for individual departments and used in performance evaluation.

The comparison of the differences between actual values and those forecasted in the budget and the analysis of the cause of such differences represent the nature of budgetary evaluation. When the budgetary evaluation is relevant for the organization, the managers of the departments are more encouraged to have positive attitudes regarding budget execution since they will understand the strategy, agree with the budgetary control system and be able to mitigate negative impacts caused by budget slack (Lu, 2011). It is expected, therefore, that

budgetary evaluation provides a more accurate budgetary execution. Thus, the third hypothesis is proposed:

H3: When the Evaluation of the budget variations reported to the Health Service managers in the budget process is high, the Budget Execution tends to be greater - Meeting the budget.

The Budget Execution Indicator - Meeting the Budget, defined as budgetary performance measure, is formed by two questions whose objective is to measure how suitable the budget execution was in terms of meeting the budget goals and remark of the fulfilment the budget percentage (Mucci et al., 2016), because, if the goals were met, the fulfilment percentage would reflect this reach. The remark premise by the manager of the budget fulfillment percentage is in the budget emphasis that is, reaching the budget set for the period, without remains or surpluses (Buzzi et al., 2014). The performance indicators reflect the achievement level of budgetary goals which are part of the performance measurement system. The literature presents several indicators dealt with in the studies.

According to Lu (2011), the basic performance measure of the institution would be detected by the "achievement" rate or the range of the budgetary goal, among others, such as doctor´s prescription, medical gross margin, and hospital occupancy rate. Macinati and Rizzo (2014) used, in their study, the budgetary performance measure as a percentage of attainment of budgetary goals. Abernethy and Stoelwinder (1991), in a study applied to non-profit hospitals, used indicators such as patient satisfaction, quality of the care with the patient, ability to attract funds, satisfaction of the unit staff and the level of meeting the budget, which were weighted and made up the average result for the performance measure. Taking over the expression *Meeting the budget* of Abernethy and Stoelwinder's (1991) study and Macinati and Rizzo's (2014) definition of budgetary performance, the budgetary performance measure is defined for this research, and it is called Budgetary Execution Indicator, mentioned in the hypotheses presented.

METHODOLOGY

Research design

From the theoretical framework mainly on the studies of Kenis (1979) and Lu (2011), the theoretical research model, structured by four constructs: Budgetary Participation, Budgetary Feedback, Budgetary Evaluation and Budgetary Execution Indicator - Meeting the Budget - was built. The four constructs analyzed will be measured by indicators – questions of the data collection instrument developed – since the questionnaire is a category of the survey data collection method to obtain primary data, whose development presupposes a series of activities which must be considered (Hair et al., 2005).

The Budgetary Execution Indicator - Meeting the Budget, defined

as budgetary performance measure, is formed by two questions whose objective is to measure how suitable the budgetary execution was in terms of meeting the budgetary goals and remark of the fulfilment the budget percentage (Mucci et al., 2016) because, if the goals were met, the fulfilment percentage would reflect this reach.

The organizations use budget for the funds allocation to their departments and divisions (Church et al., 2018). The budgeting process suggests that the budget reflect the strategy of the institution, being able to indicate the goals of the organization, directing the agents' behavior and offering mechanisms for these agents' performance evaluation, thus, this device translates the organization strategies in quantitative, qualitative metrics and it is relevant for both the planning of future actions, and the control of current actions (Cardoso et al., 2007). The endogenous design choices, in turn, determine several functional attributes of the budgetary system, including the accounting metrics used and the managers' discretion in the use of funds (Church et al., 2018). The hospital institutions, object of this study, are highly complex institutions, formed by several departments of high specificity and qualification, with strongly distinct features which need to be integrated in order to provide the most suitable treatment to their users. Such complexity leads to difficulties in management and challenges in the adoption of managerial accounting devices in hospital institutions comparatively larger than those faced by other kinds of enterprise (Abernethy et al., 2007).

The design of the budgetary system depends on specific organizational contexts. According to Pizzini (2006), hospitals are complex organizations whose clinical activities and care with the patient have high uncertainty level task. Studies on budget slack published in international journals consider some variables, among them, task uncertainty, budgetary emphasis, complexity level and process technology. In Brazil, the studies focused on the contingency approach to discuss how uncertainty, strategy and technology influence the use of the device and, consequently, its execution (Mucci et al., 2016).

In this context in which the hospitals are inserted, these variables can influence the use and the execution of the institution budget; however, in the development of the Budgetary Execution Indicator - meeting the budget – constructs, the assumption of the remark by the manager of the percentage of budget fulfillment is in the budgetary emphasis, that is, in meeting the budget set for the period (Buzzi et al., 2014), without surpluses or remains. Thus, it is understood that the objective of the budgetary execution is to meet the budget planned. In case there are variations, differences between planned and performed, there is a sign that the operations did not happen as planned. These variations are part of a control system to monitor the results (Atkinson et al., 2011).

Target population and sampling

The target population included clinical managers of private and public hospitals in Brazil who were involved in the budgeting process and whom a decision-making level regarding the setting of budgetary goals is assigned. In the research, the sample was non-probabilistic for convenience, like snowball sampling, in which the researcher makes the first contact with a small group of people who are relevant for the research and who will indicate possible respondents and, from these new respondents, more indications will take place until the number desired for the sample is reached (Hair et al., 2005).

Data collection methods and procedures

The development of the data collection instrument was based on

the previous studies of Swieringa and Moncur (1975), Kenis (1979) and Lu (2011). Since these questions arose from data collection instruments applied in English language studies, the translation and validation of this instrument for subsequent application, applying the cross-cultural adaptation proposed by Beaton et al. (2000) were necessary. After this validation, the instrument was finalized, and it consists of 29 closed questions, measured in five-point Likert scale, and, in the end, nine personal information questions for classifying the respondents were included, according to Table 1.

The pre-test was carried out with a five-Health-Service-manager sample, who had similar characteristics to those aimed by the sample longed, having no amendment indicated. There was the researcher´s contact with a small group of professional and teaching staff of the Health area, who first indicated the managers of the Health Service of Public and Private hospitals. From this first meeting, the return of emails containing new managers´ indication was set and 33 surveys were answered and validated. Regarding the data collection, the Project was approved by the Ethics Committee in Research of the University of São Paulo, according to the CAAE protocol: 13520813.3.0000.5407. The Structural Equation Modeling technique based on components, Partial Least Squares Path Modeling – PLS-PM, was used in the study, since it favors the studies with small samples, presenting high level of statistical power (Hair et al., 2012).

RESULTS AND DISCUSSION

By the descriptive statistics regarding the clinical managers' profile, it is highlighted that the managers of private organizations are younger (age range from 31 to 40 years old) compared to those of public ones (41 to 50 years old); however, they work in the same position for about 1 to 5 years, predominantly, in both organizations. These managers have up to 50 subordinates allocated under their responsibility. In the public sector, this index is more relevant (64%); while in private institutions, it was more balanced (53% up to 50 subordinates and 47% more than 50 subordinates).

It is highlighted that the professional experience of these managers ranges predominantly from 1 to 10 years, but we observe that, in public hospitals, there is a concentration of managers (36%) distributed in ranges above 21 years and 30 years. In private hospitals, however, only 10% of them are in the 21 to 30 year-range. From the theoretical model proposed, the result analysis follows two steps: analysis of both the measurement and structural models. The measurement model refers to the formation of constructs (latent variable) by the indicators (variables measured by the survey) representing how these variables measured gather to represent the constructs, while the structural model aims to statistically discuss the relationships between the constructs, that is, how they are associated among themselves (Hair et al., 2009).

In the measurement model, it was analyzed whether the indicators (questions of each construct) measure the Budgetary Participation, Budgetary Feedback and Budgetary Evaluation constructs; while the structural model checks the validity of the presumed theoretical relationships, that is, how well the empirical data give

support to the theoretical model. The measurement and structural models were validated in accordance with the statistical criteria set for the Structural Equation Modeling, and the final model is presented in Figure 1.

The adjusted final model is presented with the t-value statistics, the structural coefficients and the p-values, in brackets, and is presented in Table 2. It is observed, in Table 2, that for the Student's T-statistics, the t-value above 1.96 is significant for the 5% reliability level adopted in this study. If the p-value is greater than 5%, the hypothesis is rejected, otherwise, it is accepted. Regarding the relationship of the Budgetary Participation construct and the Budget Execution Indicator (Meeting the Budget), the structural coefficient of 0.128 indicated that its effect on the Budget Execution Indicator (Meeting the Budget) is positive, but weak in comparison to the other constructs, since it explains just 12.8% of the variation of the Meeting the Budget indicator in relation to 1% of variation in the Budgetary participation.

Regarding the significance of the relationship between these constructs, H1 hypothesis is not sustained. This ascertainment does not corroborate with the findings of Kenis (1979), because the relationship was not only positive, but also significant to explain the budgetary performance of the area/unit of the managers researched, revealing that the budgetary participation tends to improve the managers´ budgetary performance. On the other hand, in Lu (2011) study, the budgetary participation is also related positively to the performance, but it is mediated by variables which represent budget perceptions. The structural coefficient of the Budgetary Feedback and Budget Execution Indicator (Meeting the Budget) relationship was 0.274, indicating a positive effect, and being responsible for explaining 27.4% of the variation of the Meeting the Budget indicator in relation to 1% of variation in the Budgetary Feedback.

In Kenis (1979) study, the Budgetary Feedback presented a positive, but not significant relationship to explain the Budget Execution performance, as observed in the research. According to the author, the results suggest that the feedback on the level of meeting the goal was inefficient in promoting performance.

According to Lu (2011), the Budgetary Feedback information has power on supervision, performance measurement and control, but such ascertainment was not obtained in the study. Yuen (2004) points that the central idea is that the Budgetary Feedback in the performance evaluation, when carried out in constructive, objective and fair manner, is essential for setting up the budgetary goals during the budget process, reducing the possibility of budgetary slack as well. The Budgetary Evaluation and Budget Execution Indicator (Meeting the Budget) relationship presented the structural coefficient of 0.479, the one which has the greater effect, also positive, in comparison to the Budgetary Participation and the Budgetary Feedback, explaining 47.9% of the variation of the Meeting the Budget indicator in relation to 1% variation in the Budgetary Evaluation.

Table 1. Constructs, indicators and questions of the collection instrument.

Construct	Indicadors	Questions
Budgetary participation	PO_q1	I am involved in setting all portions of my budget.
	PO_q2	My budget is not final until I am satisfied with it.
	PO_q3	My opinion is an important factor in setting my budget.
	PO_q4	I work with my subordinates in preparing the budget for my unit.
	PO_q5	I am consulted about special factors I would like to have included in the budget being prepared.
	PO_q6	New budget include changes I have suggested.
	PO_q7	I am allowed a high degree of influence in the determination of my budget goals.
	PO_q8	I really have little voice in the formulation of my budget goals. (reverse item)
Budgetary feedback	FO_q9	I receive a considerable amount of feedback about my achievement concerning my budget goals.
	FO_q10	I am provided with a great deal of feedback and guidance about my budget variances.
	FO_q11	My boss lets me know how well I am doing in terms of achieving my budget goals.
Budgetary evaluation	AO_q12	My superior demands that I am responsible for budget gap.
	AO_q13	My superior has asked me to keep up with schedule as to fulfill budget objectives.
	AO_q14	My superior would consider my performance unsatisfactory when a big budget gap occurs in my department.
	AO_q15	My superior would be discontent with my budget gap in my department.
	AO_q16	I am required to prepare reports comparing actual results with budget.
	AO_q17	My superior calls me in to discuss variations from the budget.
	AO_q18	I am required to trace the cause of budget variances to groups or individuals within my unit.
	AO_q19	I am required to report actions I take to correct causes of budget variances.
Indicator of budget execution	IE_q28	Observing the achievement of budgetary goals for 2014, my unit/area executed the budget appropriately.
	IE_q29	Indicate the percentage range of budget achievement of the unit/area under your responsibility. Such execution percentage refers to the amount estimated for 2014 in relation to the budget actually performed for the same year. In case it surpassed the amount estimated, consider the percentage higher than 100%.

This ascertainment goes against Kenis (1979) results, in which the relationship between these variables was weak; but in the study developed by Elhamma (2015), the results corroborate the finding of hypothesis 3, in which the Budgetary evaluation presented a significant and positive relationship to explain performance. Regarding the statistical significance of the relationship between these constructs, the values presented are considered significant, supporting hypothesis 3. Thus, the only statistically significant relationship of the structural model proposed was the one of the Budgetary Evaluation and the Budget Execution Indicator (Meeting the Budget) construct, explaining approximately 50% of the variation in the Budget Execution Indicator– performance measure
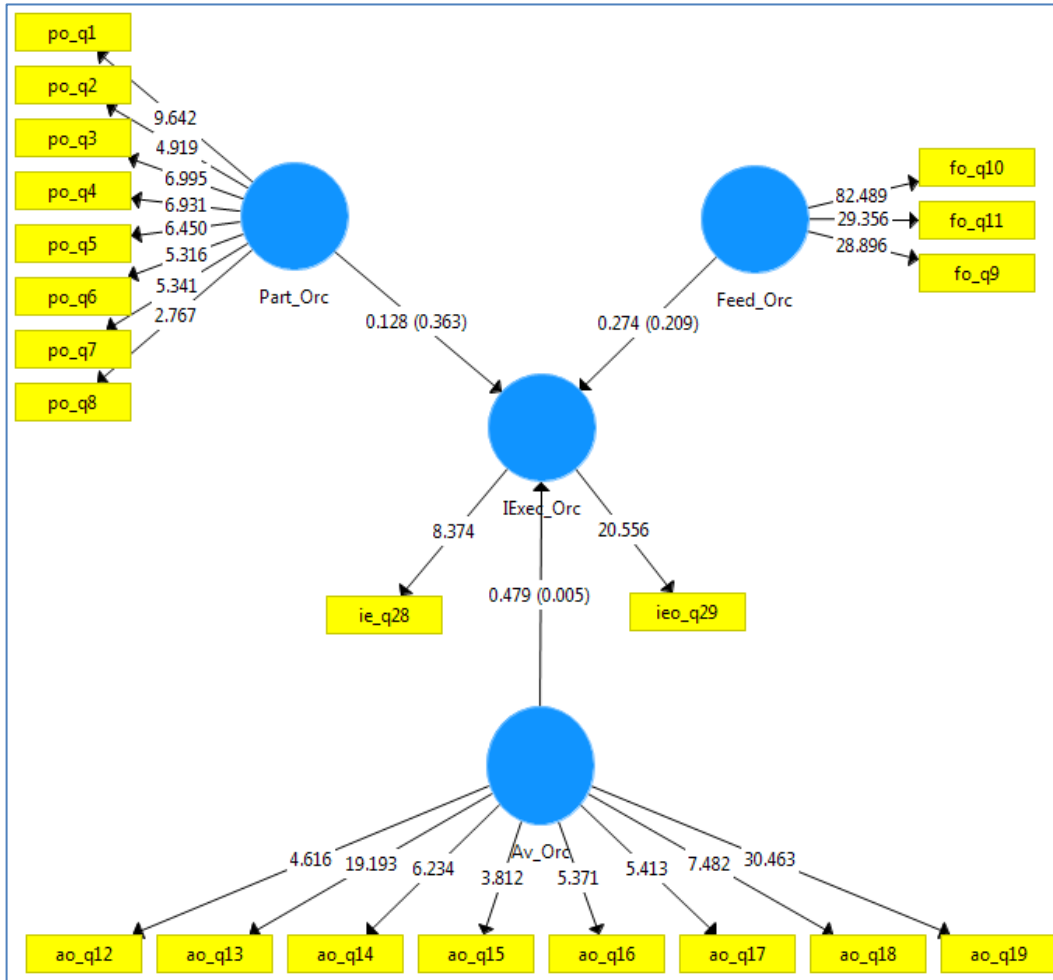
Figure 1. Final adjusted model - analysis of the structural model by bootstrapping. PO, Budgetary Participation; FO, Budgetary Feedback; AO, Budgetary Evaluation; IE, Budget Execution Indicator – Meeting the Budget.

Table 2. Structural coefficients and t- and p- value statistics.

	Structural coefficient	t-value	P- value
AO-> IE	0.479	2.807	0.005**
FO-> IE	0.274	1.256	0.215
PO-> IE	0.128	0.911	0.341

and still interacting positively.

This result attests that the Health Service managers, mainly the ones in the Nursing Service, recognize the Budgetary Evaluation as a predominant characteristic which interferes in the budget execution of the area/sector under their responsibility, due to the liability on the results presented for producing scarce funds and for being inserted in this process, many times without the necessary set of knowledge, abilities and skills for such activity. To better elucidate the analysis of the Budgetary

Evaluation characteristic, it was interesting to check if there were differences in the perception of the Health Service managers regarding the funds Budget Execution, whether they were public or private.

In order to do so, a non-parametric test called Mann-Whitney was performed, comparing the results of the questions of the Budget Execution Indicator of the managers who work in institutions in which the funding of the service was predominantly public or private. The result of this test generated a 0.701 p-value statistics,

above the 5% reliability level, claiming the hypothesis that there is no difference in the perception of both Health Service managers in relation to the Budget Execution Indicator, which demonstrates that the funding type does not interfere with the form of budget execution of these funds by the managers of this study.

Final considerations

The present research sought to investigate the relationship of the budgetary process characteristics, under the perception of health service managers of both public and private hospitals, on the performance of budgetary execution, based on Kenis' (1979) and Lu's (2011) studies. The hypotheses elaborated based on covered literature culminated in the theoretical model developed, in which it was sought to statistically test the relationship of the constructs which comprehend these characteristics with the budget execution performance measured by the Budget Execution indicator called Meeting the Budget. By the result analysis, it was determined that there is positive relationship between the Budgetary Participation and Budgetary Feedback and the Budgetary Execution Indicator, despite the fact they did not present statistical significance, causing the H1 and H2 hypotheses to be rejected.

This ascertainment has not corroborated with the findings in Kenis (1979) study, since the relationship was not only positive, but also significant to explain the budgetary performance of the area/unit of the researched managers, revealing that budgetary participation tends to improve the managers' budgetary performance. On the other hand, in Lu (2011) the budgetary participation was also positively related to performance, but it was intermediated by variables which represent budgetary perceptions.

Macinati and Rizzo (2014) argue that the introduction and the use of techniques and tools of the business environment in the Health care sector can improve these managers' decision-making process if the participation in setting budgetary goals is properly stimulated.

According to the few studies carried out in Brazil, in the Healthcare sector, this participation is not so substantial because it depends on education and training on costs, change on the liability form and autonomy within the hospitals since their activities focus on patient care.

Regarding the Budgetary Evaluation construct, it was determined that there is a positive and statistically significant relationship between the constructs, sustaining the H3 hypothesis. Thus, the Budgetary Evaluation, a budgetary characteristic, explains 47.9% of the variation of the Budgetary Execution Indicator (Meeting the Budget) in the research model proposed for this sample of Health Service Managers. The confirmation of this hypothesis was not corroborated by Kenis´ (1979) study, but it was a relevant ascertainment for this environment

of the Health sector, regarding the sample studied; since, despite having Budgetary Participation and Budgetary Feedback, these managers guide themselves by the Budgetary Evaluation, that is, how much the budget variations are reported to the responsible ones and used for purposes of liability of these managers. When it comes to a complex service with unique characteristics, the Health Service managers make decisions to allocate scarce funds, whose consequences of such allocation impact directly the assistance given to the patient, since they tend to guide themselves to a short-term decision.

This decision may interfere directly in the budget execution performance, which is the reason why the managers' care about the outcomes of a not appropriate execution, since they are responsible for the result generated.

Contributions

The results obtained also present contributions to the Management Accounting literature, regarding the budget and the interaction of this tool with the agents involved who are inserted in complex environments, as the health organizations are. In this environment, the services have peculiar characteristics, highlighting that the participation and feedback received from the budgetary information are relevant so that the budget is properly executed, but what matters is the budgetary evaluation, since these goals can be related to incentive and compensation systems, besides being liable for the results of this budgetary execution. It is highlighted that when the introduction of these mechanisms as something which will improve performance, process refinement, cost control, efficiency in funds allocation, performance evaluation and the kind of institution, the characteristics of the service provided and how the relationships between the agents and the principal in this process take place cannot be ignored.

Limitations and future research

The findings of this research are limited to the sample studied, since a non-probabilistic sample which interferes in the power of result generalization was used, considering the origin of the collection instrument and the cultural aspect which can interfere in the translation and validation process as limitation.

Future researches can be developed, considering the expansion of the health service manager sample to seek greater generalization power of the proposed model, the conducting of case studies to deepen analysis and promote the data triangulation, as well as add variables that deal with remuneration and incentive system, which can improve this analysis of the adoption of Managerial Control devices in Healthcare sector and how they are

related to the budgetary execution performance.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Abernethy M, Chua WF, Grafton J, Mahama H (2007). Accounting and Control in Health Care: Behavioural, Organisational, Sociological and Critical Perspectives, w: eds. CS Chapman, AG Hopwood, MD Shields, Handbook of Management Accounting Research.

Abernethy M, Guthrie CH (1994). An empirical assessment of the "fit" between strategy and management information system design. Accounting and Finance 34(2):49-66.

Abernethy M, Stoelwinder JU (1991). Budget use, task uncertainty, system goal orientation and subunit performance: a test of the 'fit' hypothesis in not-for-profit hospitals. Accounting, Organizations and Society 16(2):105-120.

Aidemark LG (2001). Managed health care perspectives: a study of management accounting reforms on managing financial difficulties in a healthcare organization. European Accounting Review 3(10):545-560.

Almeida AG, Borba JA, Flores LCS (2009). A utilização das informações de custos na gestão da saúde pública: um estudo preliminar em secretarias municipais de saúde do estado de Santa Catarina. Revista de Administração Pública 43(3):579-607.

Anthony RN, Govindarajan V (2008). Sistemas de Controle Gerencial. São Paulo: McGraw-Hill.

Atkinson AA, Kaplan RS, Matsumura EM, Young SM (2011). Contabilidade Gerencial. São Paulo: Atlas.

Beaton DE, Bombardier C, Guillemin F, Ferraz MB (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. Spine 25(24):3186-3191.

Bonacim CAG, Araújo AMP (2010). Gestão de custos aplicada a hospitais universitários públicos: a experiência do Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto da USP. Revista de Administração Pública 44(4):903-931.

Buzzi DM, dos Santos V, Beuren IM, Faveri DB (2014). Relação da folga orçamentária com participação e ênfase no orçamento e assimetria da informação. Revista Universo Contábil 10(1):06-27.

Cardoso LC, Mário PC, Aquino ACB (2007). Contabilidade Gerencial: mensuração, monitoramento e incentivos. Editora Atlas, São Paulo-SP.

Church B, Kuang Xi, Liu Y (2018). The effects of measurement basis and slack benefits on honesty in budget reporting. Accounting, Organizations and Society 72(C):74-84.

Covaleski M, Evans JH Luft J, Shields MD (2007). Budgeting research: three theoretical perspectives and criteria for selective integration. Handbooks of Management Accounting Research 2:587-624.

Dallora MEL, Forster AC (2008). A importância da gestão de custos em hospitais de ensino-considerações teóricas. Medicina (Ribeirao Preto. Online) 41(2):135-142.

de Oliveira WT, Haddad MDCL, Vannuchi MTO, Rodrigues AVD, Pissinati PDSC (2014). Capacitação de enfermeiros de um Hospital Universitário público na gestão de custo. Revista de Enfermagem da UFSM 4(3):566-574.

Elhamma A (2015). The relationship between budgetary evaluation, firm size and performance. Journal of Management Development 34(8):973-986.

Francisco IMF, Castilho V (2002). A enfermagem e o gerenciamento de custos. Revista da Escola de Enfermagem da USP 36(3):240-244.

Gibbons R, Roberts J (2013). Economic theories of incentives in organizations. Handbook of Organizational Economics pp. 56-99.

Hair J, Babin B, Money A, Samouel P (2005). Fundamentos de métodos de pesquisa em administração. Bookman Companhia Ed.

Hair J, Babin B, Money A, Samouel P (2009). Fundamentos de métodos de pesquisa em administração. Bookman Companhia Ed.. Análise Multivariada de dados. Porto Alegre: Bookman.

Hair JF, Sarstedt M, Ringle CM, Mena JA (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. Journal of the Academy of Marketing Science 40(3):414-433.

Hammad SA, Jusoh R, Oon EY (2010). Management accounting system for hospitals: a research framework. Industrial Management and Data Systems 110(5):762-784.

Imoniana JO, Silva WL (2019). Understanding internal control environment in view of curbing fraud in public healthcare unit. African Journal of Business Management 13(18):602-612.

Jacobs K (1998). Costing health care: a study of the introduction of cost and budget reports into a GP association. Management Accounting Research 9(1):55-70.

Jensen MC, Meckling WH (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics 3(4):305-360.

Kenis I (1979). Effects of Budgetary Goal Characteristics on Managerial Attitudes and Performance. The Accounting Review 54(4):707-721.

King R, Clarkson PM, Wallace S (2010). Budgeting practices and performance in small healthcare businesses. Management Accounting Research 21(1):40-55.

LA Forgia GM, Couttolenc BF (2009). Desempenho hospitalar no Brasil: em busca da excelência, São Paulo: Singular.

Li W, Nan X, Mo Z (2010). Effects of budgetary goal characteristics on managerial atitudes and performance. International Conference on Management and Service Science. pp. 1-5.

Lu CT (2011). Relationships among budgeting control system, budgetary perceptions, and performance: A study of public hospitals. African Journal of Business Management 5(15):6261-6270.

Lunkes J R (2009). Manual de orçamento, São Paulo: Atlas.

Macho-Stadler I, Perez-Castrillo D (2020). Agency Theory meets matching theory. In Series, pp.1-33.

Macinati MS (2010). NPM Reforms And The Perception Of Budget By Hospital Clinicians: Lessons From Two Case-Studies. Financial Accountability and Management 26(4):422-442.

Macinati MS, Bozzi S, Rizzo MG (2016). Budgetary participation and performance: The mediating effects of medical managers' job engagement and self-efficacy. Health Policy 120:1017-1028.

Macinati MS, Rizzo MG (2014). Budget goal commitment, clinical mangers1 use of budget information and performance. Health Policy 117:228-238.

Merchant KA, Manzoni JF (1989). The achievability of budget targets in profit centers: A field study. In Readings in Accounting for Management Control pp. 496-520.

Mucci DM, Frezatti F, Dieng M (2016). As múltiplas funções do orçamento empresarial. RAC-Revista de Administração Contemporânea 20(3):283-304.

Pettersen IJ (1995). Budgetary control of hospitals-Ritual rhetorics and rationalized myths? Financial Accountability and Management 11:207-207.

Pizzini MJ (2006). The relation between cost-system design, managers' evaluations of the relevance and usefulness of cost data, and financial performance: an empirical study of US hospitals. Accounting, Organizations and Society 31(2):179-210.

Silva MT, Lancman S, do Carmo Alonso CM (2009). Conseqüências da intangibilidade na gestão dos novos serviços de saúde mental. Revista de Saúde Pública 43(suppl. 1):36-42.

Swieringa RJ, Moncur RH (1975). Some effects of participative budgeting on managerial behavior. National Association of Accountants.

Yuen DCY (2004).Goal Characteristics, communication and reward systems, and managerial propensity to create budgetary slack. Managerial Auditing Journal 19(4):517-532.

Zucchi P, Del Nero C, Malik AM (2000). Gastos em saúde: os fatores que agem na demanda e na oferta dos serviços de saúde. Saúde e Sociedade 9(1-2):127-150.

African Journal of Business Management

AJ ACADEMIC JOURNALS
expand your knowledge

Full Length Research Paper

Sunday consumer behavior: A case study in retail marketing

Pierluigi Passaro*, Paola Perchinunno and Dario Schirone

Department of Economy, Management and Law Company, University of Bari Aldo Moro, Italy.

The Sunday opening of shops is a very debated topic on both international and national levels. On a European level, the regulation of Sunday work is varied, with most Member States that, like Italy, do not impose restrictions on openings and working hours. The present work aims to analyze the European reference framework of Sunday openings, focusing on the Italian situation, which is currently experiencing proposals for change. Moreover, from the statistical analysis of the purchase data made in the main Italian stores of a multinational company, the "profile of the Sunday consumer" is highlighted, analyzing the characteristics and peculiarities that orient Sunday shopping. The Two Step cluster analysis provides different profiles, among which emerges the consumer profile of Sunday, which assumes peculiar characteristics and different from those of consumers of the other days of the week.

Key words: Sunday shopping, consumer profile, cluster analysis.

INTRODUCTION

The regulation of Sunday work is a subject that has long divided and has been long discussed by public opinion. The arguments against liberalization policies of the sector are numerous: religious organizations defend the uniqueness of Sunday as a day of rest, the trade unions highlight the right of workers to stay with the family, while small and medium-sized enterprises seek prohibiting openings Sunday a protection against the competition of modern retailers (Kim, 2016; Danchev and Genakos, 2015; Skuterud, 2005; Gruber and Hungerman, 2008; Tanguay et al., 1995).

In Europe, the regulatory model of working hours and Sunday openings is the most varied. In some EU Member States there is no restriction on timetable nor Sunday opening. Italy, therefore, belongs to the group of

countries with a more competitive discipline, but certainly it is not an exception in the European panorama (Kovács and Sikos, 2016; Choi and Jeong, 2016; Clemenz, 1990; Ingene, 1986; Kay and Morris, 1987; Price and Yandle, 1987; Tanguay and Upton, 1986).

The present work aims to frame the European situation of Sunday openings, focusing attention on the current Italian situation. Moreover, from the analysis of the data carried out on the main Italian stores of a well-known Swedish multinational, the profile of the Sunday consumer is highlighted, analyzing in detail his personal characteristics, spending preferences and the motivations that drive him to Sunday shopping.

The analysis contained in this work involves both the "quality" of the law and its actual innovative charge;

---

moreover it analyzes the verification of the implementation of the new law and therefore the real interest shown by the local and regional autonomies in pursuing an opening policy of a very crucial sector, as it is undervalued for the productivity of the entire economy and for the overall efficiency of the Italian economic system.

This last statement becomes even more significant if it is inserted in the framework of the enormous transfer of competences envisaged by constitutional federalism, including the passage of exclusive legislative power to the regions in matters of trade. The evaluation of the "Bersani Law" becomes, therefore, a first litmus test of the institutional structure of the overall economic policy and of the sectoral policies. A structure that responds, on one hand, to the traditional principles of decentralization efficiency, on the other hand, raises numerous questions in relation to the possible disincentive towards liberalizations and market (more direct lobbying by some categories; more possible conditioning).

The result of the law on trade, therefore, can be very useful to understand more clearly not only the advantages, but also the risks and potential problems that may arise in the process of complete implementation of federalism.

The Italian retail trade presents a series of peculiarities that differentiate it markedly from that of the major European countries. For the most part, these are the same anomalies that make the national industrial system a case study in the European Union: average size per employee and very low turnover, bordering on the pulverization of the company, and very low weight of the largest companies' size. All of this with the well-known corollaries of obvious income positions, managerial inefficiencies and limited levels of research and development.

Italy is the country with a far lower market share of the top ten distributors - below 40% - compared to all other European countries and to a European average of 80%. In analogy to other indicators of the structure of our economy, the very low level of concentration in the retail trade hides very marked differences on a territorial level. Unlike the central-northern Italian regions where the presence of large retailers was greater, especially in the past decade, the South tends to have fewer large retailers on average. For example, where the regional structure appears to be unbalanced on small typologies of commercial establishments, the degree of presence of the large company is more limited. This is a circumstance that will help to understand better the regional market dynamics and, above all, the resistance to a greater opening of the local areas to the larger commercial enterprises.

The Added Value of the entire trade sector (wholesale and retail) accounts for figures close to 13% of GDP. These are high figures, even if not in a resounding way if we consider that - based on a comparison of an OECD source (Pilat, 1997) with data from some years ago - the added value of trade is equal in the USA to 16.8% of GDP and higher than that of the other southern European countries (Greece, Spain, Portugal).

The data on the Added Value of the trade are sometimes placed in relation to the degree of efficiency of the distribution sector: the greater the economic weight of the phase of forwarding of the goods to the final markets - therefore greater the resources "designated" outside the time of production - the lower the capacity of the sector to manage the intermediation activity at low cost in the national economy as a whole is lower. Similar considerations can be made regarding the share of employment attributable to the sector: the figure for Italy (17.3% of total employment) is compared with 25.8% in the United States, 16.4% of the United Kingdom, 22.3% of Spain. It is very difficult, in our opinion, to develop a criterion of "sectoral efficiency" only on the basis of the share of added value and employment; it could be argued that the high weight of commercial intermediation is a sign of an advanced tertiarization of the economy, as demonstrated, moreover, by US data.

In the Italian case the only statistics available relating to the added value of retail trade alone are surprising for their size: our country would in fact have the lowest weight of added value on total GDP against systems such as the French, German, and Dutch showing much higher measures. We should deduce from this that our retail trade is the most efficient and best organized in the West, but this consideration is hasty.

Tracing the origins of such a market structure goes far beyond the objectives of this work. Moreover, it is the entire history of the Italian company that is included in "a world from its origins determined by the fragmented physiognomy of the national market, that is, by the presence of production and consumption circuits closed in very narrow local areas". A story made up of small markets in which it seems, at times, that it was precisely the precocity of national commercial development with respect to other countries that defined salient features of the quality of our business system, regardless of the sector in which they operate and therefore included the trade segment.

At the same time, however, there is no doubt that the persistence of the phenomena of pulverization of the commercial sector and resistance to a more massive entrance of the large-scale retail trade can be justified by particularly rigid regulatory arrangements, marked by high barriers to entry and the establishment of anticompetitive practices within the sector itself. It is the role played by the heavy regulation of the commercial sector that this work intends to explore. In international comparison, Italy shows the lowest number of commercial establishments in each of the types considered.

Ultimately, the ratio of public intervention in the commercial sector cannot be traced to any market failure. The public authorities, although not directly exercising business activities, make use of a very penetrating

indirect intervention. In fact, they reach a sort of "defense against the competition" of the sector, both internal and external. This function of controlling the possible increase in the competitiveness of the sector has been carried out by the public authorities for a long time with great effectiveness and has involved: a poor market contestability, a division for territorial areas and commercial types of sales very precise and even, in some stages, a check on pricing decisions.

RETAIL CONCENTRATION

Retail and brands represent the key success factors to compete in the international arena. Stores become the place where the marketing strategies of a firm come to life; in them firms communicate, foster the loyal relationship with their customers and constantly monitors market tastes and needs. The store is a determining factor in the brand image and brand identity building processes, since it is the first place to contact the consumer. Store interactivity must be boosted in order to collect more information on consumer needs and shopping behavior.

To date, retail caters to a wider specialization, serving specific target markets with different lifestyles and transmitting images, symbols and emotions. On the other hand, it presents deep fragmentation, limited efficiency in the distribution network and the high presence of small independent shops. This structure derives from the sector's need for differentiation, since the point of sale increases the product added value (Ravazzoni and Panciroli, 2002). Store is no longer only a logistic-operative thrust but also a more complete marketing one, especially from a relational point of view.

Location and consequently the point of sale have two dimensions: the firm one and the consumer one. They should be combined in the search for a store loyalty that matches the brand one. So far stores are physically structured in relation to the spatial position and the products sold, in order to attract consumers and create an ambience (Kotler, 1972) in which to live an experience. In order to enter the consumer evocative set, the store must make such an impression as to be positively remembered in the decision-making process while choosing products and brands (Skinner, 2008). Empirical studies (Paparelli and Del Duca, 2010) found location, service, assortment depth, price strategies, quality, and store ambience to be discriminatory factors in the relation between retail and customers. In particular, the physical features such as layout, colors, music and crowding, result as strongly affecting shopping behavior and store choice (Babin et al., 2006). For example, overcrowded stores can inhibit the shopping behavior and cause various reactions, that range from reducing the store visit frequency to postponing the scheduled purchases or giving up the shopping expedition entirely

(Carmona et al., 2010).

Moreover, store positioning proves to have a strong correlation not only with product features, such as quantity, quality and services, but also with marketing ones, namely price strategies, store format, time factors, benefit sought, consumer's perception and shopping behavior. All these elements are summarized in the store image, that is strictly correlated to the quality and reputation of the brands sold in it. The store ambience features strongly affect the consumption volume and nature.

This phenomenon is obvious especially for fashion products, in which brand notoriety is combined with locations. Firms try to create a glamour context around brands in order to realize an unforgettable experience not only in buying and consuming the product but also in the time spent choosing it within a stylish environment.

In this scenario retail is spatially redefining social spaces and the relations within the city, through the traffic flows it causes. The complex functions of selling require specific locations; from city centers, suburbs, high streets, stations, airports, and so on; while globalization and the consequent enlargement of space and time relations, necessitate easy access, no separation of the street by huge windows, and free service. Therefore, a new relation between consumers and retailers is created, based exclusively on psychological and emotional factors; image and the consumers perception of it play an important role.

Consumption, and its display – shopping-, are shaping city's identities and functions in relation to consumers' needs. The so-called "*percorsi degli elefanti*" (Zukin, 2012) creates a network that assigns new vitality and dynamism to goods and people flows.

Therefore, location strategies tend towards concentration in order to follow the evolution of consumer needs: for convenience goods concentration results in purchases in a single store; while for shopping goods concentration is the solution to the issue of minimizing search costs. On one hand, consumers look for detailed information on product prices, quality and variety, and on the other hand for entertainment and fun while shopping. To match consumer needs firms are forced to locate their stores near their competitors in the so-called shopping districts/streets.

Such a concentration derives from belonging to complementary sectors and from the presence of magnet stores that modify shopper traffic and mobility, given also the customer exchange among nearby similar commercial types. So, agglomeration is demand pull; it is possible to offer a complete set of products, that can be bought in the same shopping expedition, granting savings of time and space. At present, distance is no longer the main discriminating factor, it becomes a marketing factor rather than a geographical one. Nowadays, accessibility results as the key "shopping" criterion. To be in the city center does not assure success in itself; it is the

"accessibility image" that counts. So far, the trade-off between distance and dimension is influenced by consumers' perception of the specific store image and of the store network one (Lowe, 2005).

Urban areas seem to be the best locations for shopping agglomerations by nature. They offer visibility and direct contact as near as possible to consumers, both potential and actual. On the other hand, firms are searching for larger spaces to locate their activity and create an ambience in which consumers can experience more fun and entertainment while shopping. Unfortunately, these requirements match higher location costs and are suitable only for certain products, such as fashion ones. However, spatially they stimulate a repositioning process of city centers and their streets. Throughout all the Italian cities, Bari has been chosen for its long-established commercial tradition. As it can be observed in most of Europe, the city is repositioning its image, having lost its regional and provincial commercial leadership. Within its structure, the city center is suffering from strong competition from the suburbs where shopping malls are able to attract many consumers from different areas due to price strategies, the worsening of urban accessibility and the lack of "entrepreneurship" collaboration among central retailers (Reimers and Clulow, 2009).

THE ITALIAN ECONOMIC MODEL

The evolution of the post-crisis international economic model

As known, the international economic crisis of 2008 has affected many countries, including Italy; among its effects there is the re-opening of the long-standing debate on which the most appropriate economic policies to deal with the recession are; on one hand, the need to identify the correct strategies to be put in place to use the increasingly scarce public resources (a continuous object of spending review policies) has become increasingly incumbent; on the other hand, the use of private ones has become equally crucial (De Benedetto, 2014).

In the case, in point one of the most discussed issues was the question whether the right degree of market opening was open to competition or, in other words, what was the most suitable model of capitalism to cope with the effects of the economic crisis (Somma, 2013). According to some, in fact, in the midst of the economic crisis, the state must intervene more and more directly on the markets, until it reaches the main companies of the country - the so-called "national champions" - from excessive competition with other foreign companies (Mazzucato, 2018); according to others, on the other hand, it is only by opening the markets to greater competition that the degree of competitiveness of the country system can be increased and the national economy can be boosted, improving the performance of

companies, "economic liberalization" therefore understood as the abolition of limits to entry into particular economic sectors.

Indeed, it can be summarized that the first strategic evaluation prevailed in the period 2008-2011, perhaps finding its sublimation in the decree law no. 134 of 2008 (the so-called "Alitalia - CAI" decree), later converted into law no. 166 of 2008, which suspended for three years the powers of control of the Antitrust Authority on mergers between companies that are in certain conditions.

The second strategic assessment has instead characterized (Giulietti, 2012) the economic policy of the period 2011-2012, especially during the establishment of the technical government that, in November 2011 dedicated a whole provision to the liberalizations, the so called "Cresci Italia" decree (Decree Law No. 1 of 2012), and included other individual articles and provisions in other decrees, starting from "Salva Italia" decree (Decree Law No. 201 of 2011); which provided for the full liberalization of the days and opening hours of the shops. A national law, based on the basic idea that the question of working hours was relevant to the protection and promotion of competition and that establishes the freedom of the entrepreneur to better manage his business, in compliance with the laws and collective national agreements. Moreover, over 3.4 million employees work on Sundays in Italy (20% of total employees), of whom approximately 2.2 million in "non-essential" services.

This provision was issued at a time when the country was going through its worst post-war crisis. In this context there were more days of work and therefore a greater number of hours worked, exactly 24.5 million more hours worked, consequently more than 400 million higher salaries were paid each year, equivalent to 16,000 jobs of work; and again, consumption was supported, which would have fallen more than what occurred. The estimates define a support for consumption dynamics of +2% for non-food goods and +1% for food products.

Advantages and disadvantages of Sunday openings

Six years after the coming into force (year 2012) of the decree-law no. 214/2011, the "Salva Italia" conclusions can be drawn and express the first considerations on the possible advantages or disadvantages that the decree has brought.

According to *Federdistribuzione* (2019), the federation that represents the GDO (large-scale retail trade) in Italy, certainly the introduction of the decree has brought advantages that are immediately apparent from the rereading of the ISTAT data (National Institute of Italian Statistics).

Indeed, there are 19.5 million consumers who shop on Sundays (75% of those for family purchases) and for 58% of citizens (15 million) Sunday shopping has

become a consolidated habit. In the large-scale retail trade (GDO) there are 12 million consumers who shop every Sunday (GFK, 2018). When the stores remain open 7 days a week, Sunday is the second day by turnover, representing almost 15% of the weekly turnover.

Another proof is that there was no liberalization. Indeed, on Sundays and public holidays, only outlets remain open for which the entrepreneur is convinced to provide a service to consumers while maintaining a correct budget. According to the Trade Observatory of the Ministry of Economic Development between 2012 (year of entry into force of liberalization) and 2017, the number of outlets, even with the crisis, fell only 1.4%, consequently not a collapse of the number of shops.

The Sunday and festive openings follow the needs of the consumer and with the change of the lifestyles and purchase habits of the families, that ask for more opportunities and alternatives for their free time (Dalli and Romani, 2011).

According to the CCT, the consumer of the new millennium is increasingly an Internet user (Arnould and Thompson, 2005) and approaches consumption in a multi-channel mode (Carrù and Cova, 2012), giving an objective boost to online commerce; but the growth of e-commerce, has further introduced complexity in the activities of physical commerce, which sees its perimeter shrinking both due to the crisis, which has subtracted sales, and the action of digital market places.

In light of this data, again according to Federdistribuzione, compared to the current situation, to go back would cause a worsening of the service offered to the Italian population, whose approval is shown by the 19.5 million people who shop on Sunday and an undoubted advantage to the e-commerce, which could accelerate its growth, thus exacerbating the situation for physical commerce, which invests in territories, creating employment and local development.

Furthermore, it could generate a decrease in sales at a very complex time for trade, with a consequent slowdown in investments and a reduction in the positive impact in terms of development and employment; the fewer opening days and hours worked in outlets (and therefore lower sales) would be added to the employment tensions generated by the growth of e-commerce. Reporting the regulatory situation to the "Salva Italia" could generate lower distributed wages and an employment loss at least equal to the benefits generated since 2012 (between new jobs and protected jobs), without considering the related industries. This is also the case, as some have suggested, if sales were to spread over six days instead of seven.

Different evaluations can arise from the analysis of consumer data. In fact, the retail sales measured by ISTAT for the first 5 months of 2018 are down by -0.2%.

The decrease in consumption, in the years following 2011, is demonstrated by the ISTAT charts: retail trade declines until 2014, stabilizes in the following two years

and resumes growth in 2017, while wholesale trade stabilizes in 2013 then grows from 2016. But according to Federdistribuzione such a decrease would depend precisely on the economic crisis and on the spread of online purchases "every day and at any time of the day", not from liberalization but this assumption is not verifiable, in fact if considered in the years after 2011 the crisis has continued to hit the Italian economy hard, there is no way of verifying if in the absence of liberalization sales and turnover of the shops would have gone even worse, in an equal or even better way.

So, without the advent of e-commerce and without the economic crisis, liberalization would have led to a jump in sales, as Federdistribuzione implies? Or would nothing has changed, as the political representation of the current Italian government affirms?

MATERIALS AND METHODS

Data analysis on Sunday shopping in Italy

The debate on Sunday work is part of a context that has seen, in recent years, the retail sector characterized by a moderate sales dynamics, with a gap between the large distribution sector that has a positive sign (+1.2%) and the small one that faces obvious difficulties with a 0.3% decline. Overall, the large distribution increased by over 4% points in the period 2010-2015; its contribution to the total turnover of fixed retail trade in Italy, reaching a share close to 50% (Istat, 2018).

The territorial reading of Sunday purchases shows that the residents of Central Italy, with 25.6%, are above the national average, while the percentage falls to 23.1% for the inhabitants of Southern Italy (Table 1). On the other hand, by observing the urban areas, the residents in the center of metropolitan areas (25.6%) are more likely to make Sunday purchases than those living in the suburbs (23.6%).

Further details allow us to grasp the specificities related to the position in the family nucleus and gender. The highest incidences are observed on Sundays within family units made up of partners in pairs with or without children (Table 2). It is mainly men, both in couples with children (33.2%) and in those without (31.4%), to make purchases; high percentages are also found in the case of "single" men (27.7%).

ISTAT also has sample information referring to the complex of the different sectors of the trade obtained from the data of the Labor Force Survey of 2017. Workers employed on Sunday represent 21.1% employment, slightly share below the EU average (22.5%) and higher than in other countries: in France this share is equal to 20.1%, followed by Spain (19.8%) and Germany (18.4%).

Mainly women work on Sundays (Table 3), who represent 61.1% of Sunday workers, compared to an average share of the total employed of 47.8%. Sunday workers are relatively younger: 42.9% are under 35 years of age, 41.7% are between 35 and 49 years old. Sunday work mainly involves workers with upper secondary education (58.5%).

The descriptive results of a large distribution survey

The study starts from the analysis of the data of a well-known Swedish multinational, world leader in furniture. The choice, for the elaboration of the case study, has fallen on the "Swedish giant"

Table 1. Persons aged 15 and over who have purchased goods and services by territorial distribution and days of the week.

	North-West	North-East	Center	South	Island	Center metropolitan area	Suburbs metropolitan area	Italy
Sunday	24.3	23.8	25.6	23.1	24.9	25.6	23.6	24.2
Saturday	55.2	52.1	51.9	49.1	49.2	56.1	56.0	51.9
Day off	42.3	40.4	41.2	42.6	40.4	45.5	43.6	41.6
Average weekly day	43.4	41.4	42.2	45.3	41.7	47.4	45.1	43.0

Source: Istat, Multipurpose Survey "Use of Time"

Table 2. Persons aged 15 and over who have performed the activity of purchasing goods and services on Sundays, by gender, position in the family unit, working condition.

Sex	Partner in pairs with children	Partner in pairs without children	Son/Daughter	Single	Single parent
Males	33.2	31.4	11.5	27.7	25.7
Females	24.4	24.2	16.1	18.9	22.3
Total	28.8	27.8	13.5	22.6	22.8

Source: Istat, Multipurpose Survey "Use of Time".

because it owns 21 stores distributed all over the national territory; moreover, always in the business strategy, is previewed the Sunday opening to support of the business. From the analysis of the data on the main Italian stores of a Swedish multinational, in all the Italian cities studied the number of visitors is higher both on Saturdays and Sundays; this figure also combines the largest number of buyers (Figure 1). In the stores observed we found that 42% of buyers are concentrated between Saturday (19%) and Sunday (23%). In the remaining 5 days, 48% of buyers are concentrated with percentages between 11 and 12%.

In the same way on Sunday there is an increase in turnover (+50% compared to the weekly average) in all the stores analyzed. In particular, in the Turin store the daily turnover on Sunday is equal to 1,124 euros compared to the average 718 euros per week (Figure 2).

Sunday consumer behavior

Sunday opening seems to have a genuine positive effect on spending, but not on all products, because it is only partly attributed to attracting expenses from other segments.

In the case of the Bari store it emerges that on Sunday there was a decline in the share of "furniture sector (SH)" (46.8%) and a peak in the share of "accessories sector (MH)" (53.2%). This means that the Sunday consumer focuses more on accessory products, considering Sunday shopping as a leisure time to spend with the family (Figure 3).

A further characteristic of the profile of the Sunday consumer concerns the territorial origin. In fact, while on all days of the week consumers from Bari and the province are about 70%, on Sunday this percentage drops to 54%, leaving room for consumers from other provinces of the Puglia region or even from other regions (Figure 4). 10.6% of Sunday's consumers come from the province of Taranto, while 8% from the province of Barletta Andria Trani (BAT). But there is also a 5.3% of consumers coming from Basilicata (4.2% from the province of Matera, European capital of culture 2019, and 1.2% from the province of Potenza).

Cluster analysis on Sunday consumer behavior

The cluster analysis technique is very advantageous since it provides "relatively distinct" clusters between them (that is heterogeneous), each consisting of units (families) with a high degree of "natural association". The different approaches to cluster analysis are united by the need to define a matrix of dissimilarity or distance between the n pairs of observations, which represents the point from which each algorithm is generated.

The chosen cluster analysis technique is "TwoStep". This is an extension of the distance measures used by Banfield and Raftery (1993) based on the model, introduced for data with continuous attributes. The TwoStep algorithm has two advantages: it treats mixed-type variables and automatically determines the optimal number of clusters, although it allows to set the desired number of clusters. The TwoStep, very efficient for large data sets, is a scalar cluster analysis algorithm and can deal simultaneously with continuous and categorical variables or attributes.

It is achieved through two steps: in a first step, defined as pre-cluster, the records are pre-classified in many small sub-clusters; in a second step the sub-clusters (generated in the first step) are grouped into a number of clusters that optimizes the Bayesian Information Criterion (BIC) defined as:

$$BIC_k = r_k \ln n \square 2l_k \tag{1}$$

where rk is the number of independent parameters and

$$l_K = \Sigma_{v=1}^{k} \xi_v \tag{2}$$

is the function of log-likelihood, for the step with k clusters, which can be interpreted as the dispersion within the identified clusters. It also represents the entropy within the k clusters in the case in which only categorical variables are considered.

Table 3. Employees in the trade sector who work or not on Sunday according to some characteristics - Year 2017.

Socio-economic characteristics	Do not work on Sundays	Work on Sundays
Sex		
Males	58.1	38.9
Females	41.9	61.1
Age class		
15-34	32.8	42.9
35-49	44.1	41.7
50 and over	23.1	15.5
Geographical distribution		
North	53.5	51.7
Center	19.2	23.6
South	27.2	24.7
Title of study		
Middle School diploma	31.0	30.6
Diploma	56.0	58.5
Degree	13.0	10.9

Source: Istat, Labor Force Survey.

The automatic determination of the cluster is divided into two successive stages:
(1) The initial estimates of the number of clusters are determined through the BIC criterion that provides a reliable initial estimate of the maximum number of clusters (Chiu et al., 2001) that is set equal to the number of clusters in which the ratio BIC_K / BIC_1 is less than a very small value c_1.

$$R(k) = \frac{d_{k-1}}{d_k}$$

(2) The initial estimates are then refined by the ratio, where d_{k-1} is the distance if k clusters are joined to k-1 clusters. The number of clusters is obtained for the solution in which a consistent change variation $\frac{R(k_1)}{R(k_2)}$ for the two largest values of $R(k)$ with k=1,2,..., k_{max} (k_{max} obtained from the first phase). If the ratio is larger than a threshold value c_2 (with $c_2 > c_1$), the number of clusters is set equal to k_1, otherwise it is set equal to the solution with the greatest $R(k)$.

RESULTS AND DISCUSSION

From the application of cluster analysis to our archive of 34,371 consumers of Bari store, four different clusters emerged, of fairly similar size to each other, to which different consumer profiles were combined.

Figures 5a and b and 6a and b show the profiles of the variables related to the four clusters obtained. In particular, the characteristics of the different clusters refer to the day of purchase, residence of the consumer and economic entity of the purchase.

This therefore leads to the following profiles:

(1) Cluster 1 consumer of the Sunday, resident in the same province of the store: They are consumers resident in Bari who go to the store to spend Sunday, maybe with the family, buying low-cost products;
(2) Cluster 2 consumer of the weekly, resident in the same province of the store: They are the habitual consumers residing in Bari who go only on weekdays to the store to buy different products with an average low cost;
(3) Cluster 3 consumer predominantly of the Sunday, resident in the same region: They are consumers who reside outside the province (Bari) but in the same region to which the store belongs (Puglia) and go mainly on Sundays to buy products with differentiated costs;
(4) Cluster 4 consumer predominantly of the Sunday, resident outside the region: They are all the consumers who travel long distances, arriving from other regions, to go to the store, spend a day and buy products with different costs.

The objective of the cluster analysis was to identify profiles and this aim has been partially achieved. Indeed, the results obtained show that it is possible to identify social stratifications according to the day of purchase, residence of the consumer and economic entity of the purchase.
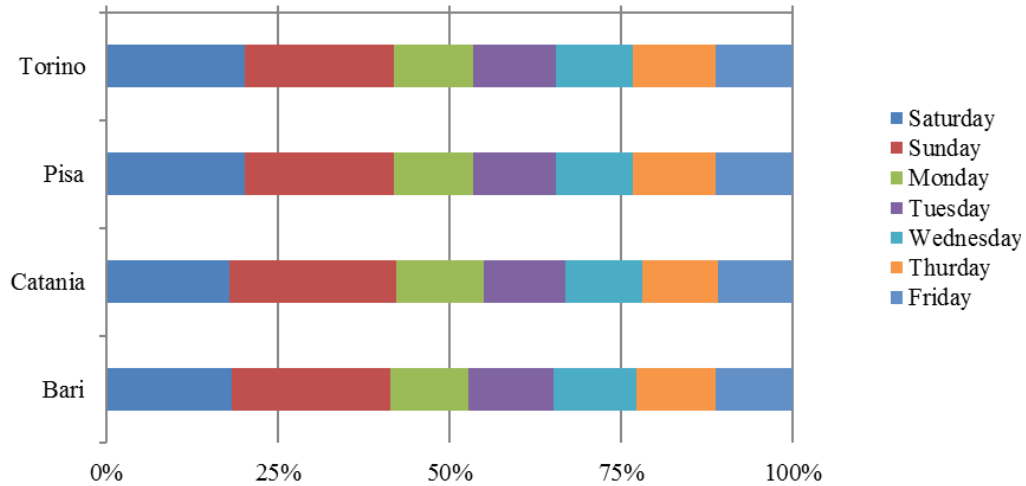
Figure 1. Average number of daily buyers in the main Italian stores.
Source: Our elaboration on Great distribution survey.
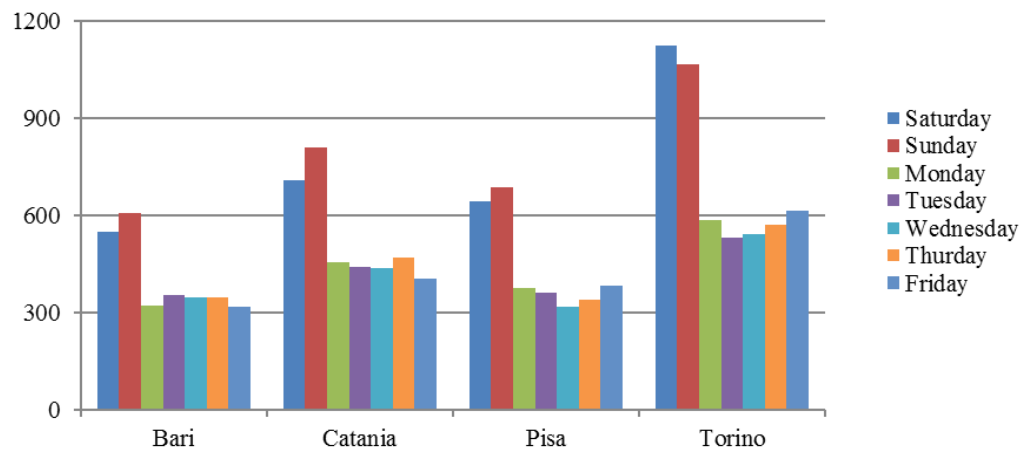
Figure 2. Average daily turnover in the main Italian stores.
Source: Our elaboration on Great distribution survey.
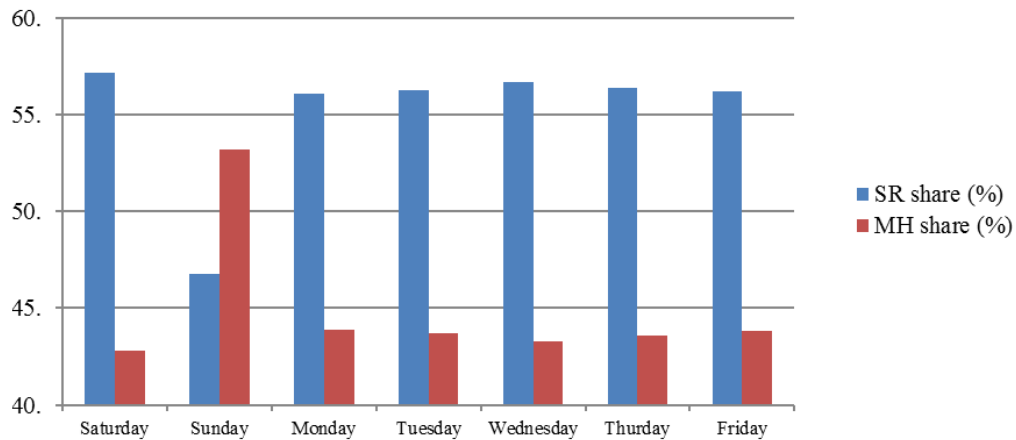
Figure 3. SH and MH share (%) in the Bari store by day of the week.
Source: Our elaboration on Great distribution survey.
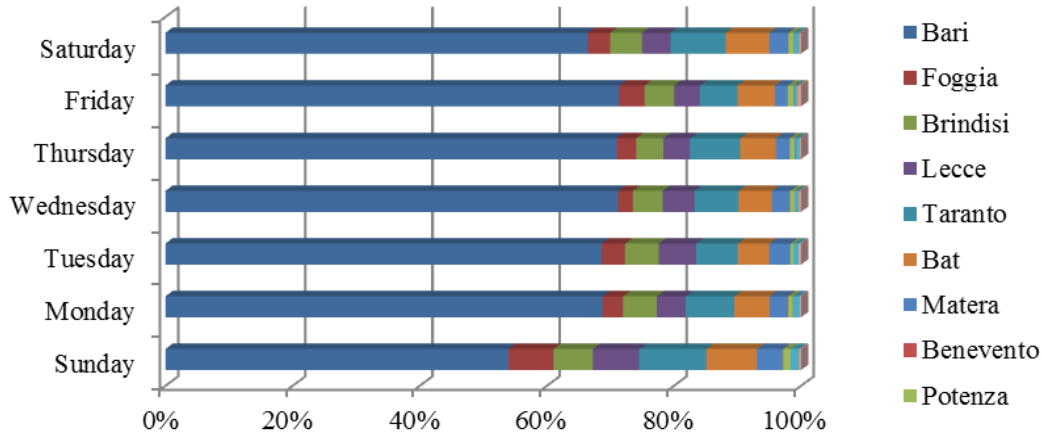
Figure 4. Percentage distribution of the number of consumers by day of the week and geographical origin.
Source: Our elaboration on Great distribution survey.
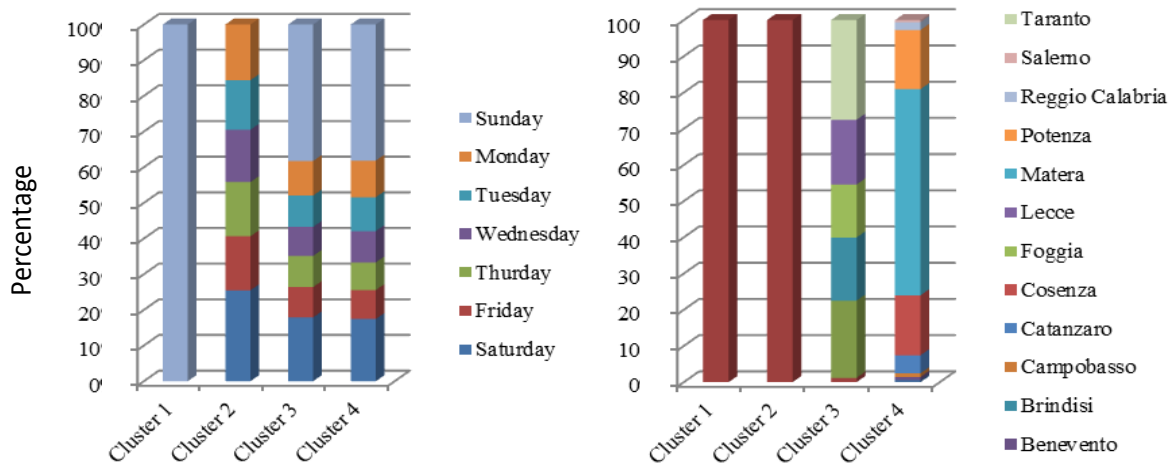
Figure 5. Composition of clusters for purchase day (a) and province of consumer residence (b).
Source: Our elaboration on Great distribution survey.

The analysis thus becomes a useful tool for company policies in order to implement actions to "convert" the largest number of visitors into customers; consequently, an evolution of this work may be the analysis and measurement of the conversion rate in the week and on the weekend.

CONCLUSION

In the last twenty years many European countries have liberalized the Sunday trade. However, there is no systematic evidence at the transnational level on the impact of these changes.

The Italian retail trade has some characteristics that differentiate it from that of the major European countries.

In analogy to other indicators of the structure of our economy, the low level of concentration in retail trade hides very marked differences at the territorial level.

At European level, the regulation of Sunday work is heterogeneous, with a majority of Member States that, like Italy, do not impose restrictions. The economic evidence available today presents the possibility of opening Sunday as: positive for the efficiency of companies, positive for employment prospects and positive for services rendered to consumers. The Sunday and festive openings follow the needs of the consumer and with the changing of lifestyles and purchase of the families, ask for more opportunities and alternatives to fill their free time.

From the analysis of the data carried out on the main Italian stores of a well-known Swedish multinational, itz
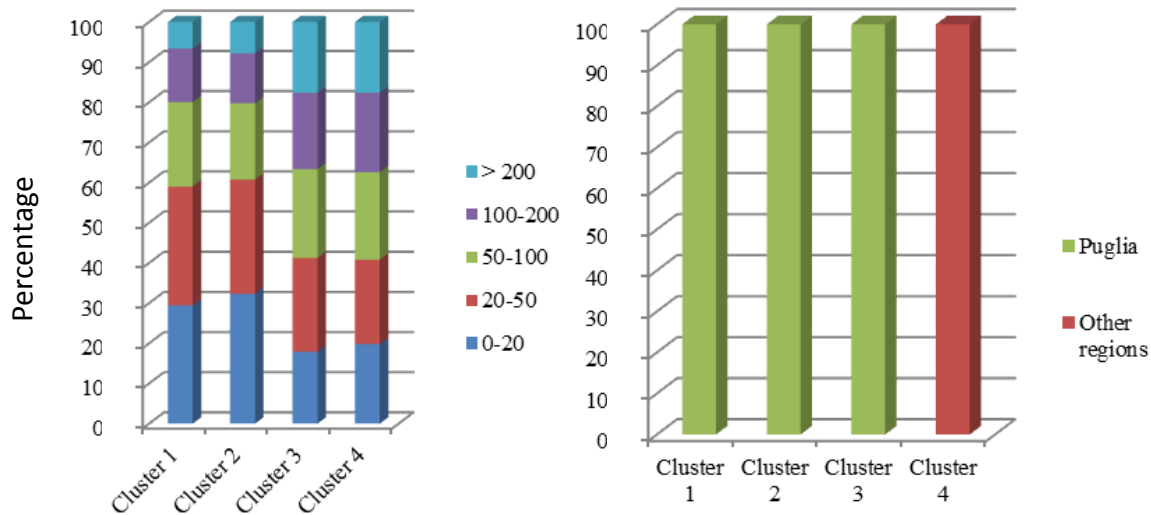
Figure 6. Composition of clusters for amount of expense (a) and residence in the same or other region (b).
Source: Our elaboration on Great distribution survey.

clearly emerges that in all the Italian cities subject to observation the number of visitors is higher both on

Saturdays and Sundays; this figure also matches the largest number of buyers. What draws attention is the geographical origin of consumers combined with the type of purchases made.

From the Two Step cluster analysis four different profiles were obtained, among which emerges the consumer profile of Sunday, which assumes peculiar characteristics and different from those of consumers of the other days of the week.

It is, in fact, mainly people residing outside the provincial territory who spend Sunday in the stores, buying furnishings and accessories. From this it can be deduced therefore that these consumers are purely "Sunday consumers" who on other days of the week would probability not visit these outlets and make purchases.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Arnould EJ, Thompson CJ (2005). Consumer Culture Theory (CCT): twenty Years of Research. Journal of Consumer Research 31(1):868-882.
Babin BJ, Chebat J, Robicheaux R (2006). Introduction to the Special Section on Retailing Research: The Mind and Emotion of the 21st Century Shopper. Journal of Business Research 59(12):1279-1280.
Banfield JD, Raftery AE (1993). Model-based Gaussian and non-Gaussian clustering. Biometrics 49:803-821.
Carmona M, Heath T, Oc T, Tiesdell S (2010). Public places urban spaces: the dimensions of urban design. Routledge, London, UK.

Carrù A, Cova B (2012). Experiencing Consumption: Appropriating and Marketing Experience. In: Penaloza L, Toulouse N, Visconti LM (eds.) Culture Marketing, London, Routledge.
Chiu T, Fang D, Chen J, Wang Y, Jeris C (2001). A robust and Scalable Clustering Algorithm for Mixed Type Attributes in Large Database Environment. Proc. of the seventh ACM SIGKDD International conference on knowledge discovery and data mining. P 263.
Choi YJ, Jeong J (2016). Effects of the Sunday shopping restriction in Korea. Contemporary Economic Policy 34(1):203-215.
Clemenz G (1990). Non-sequential consumer search and the consequences of a deregulation of trading hours. European Economic Review 34:1323-1337.
Dalli D, Romani S (2011). Il Comportamento del consumatore. Franco Angeli Editore, Milano.
Danchev S, Genakos C (2015). Evaluating the impact of Sunday trading deregulation. CEP discussion paper (CEPDP1336). Centre for Economic Performance (CEP), London, UK. Available at: http://eprints.lse.ac.uk/61156/
De Benedetto M (2014). Diritto amministrativo e crescita economica. In: Il diritto dell'economia 1/2014:189-207.
Federdistribuzione (2019). Elaborazione sui dati aziendali del 2018. Available at: https://www.federdistribuzione.it
GFK Growth from Knowledge, research (2018). La liberalizzazione degli orari di apertura. Available at: https://www.gfk.com/it
Giulietti W (2012). Crisi economica e liberalizzazioni. In: Il diritto dell'economia 1:113-127.
Gruber J, Hungerman DM (2008). The Church vs. The Mall: What Happens When Religion Faces Increased Secular Competition. The Quarterly Journal of Economics 123(2):831-862.
Ingene CA (1986). The effect of "Blue Laws" on consumer expenditures at retail. Journal of Macromarketing 6:53-71.
Istat (2018). Multipurpose Survey "Use of Time", Indagine Multiscopo sulle famigli: aspetti della vita quotidiana. Available at: https://www.istat.it/it/archivio/217037
Kay JA, Morris CN (1987). The economic efficiency of Sunday trading restrictions. Journal of Industrial Economics 36(2):113-129.
Kim B (2016). The Welfare Effects of Sunday Shopping Regulation in Retail Markets.
Kotler P (1972). A Generic Concept of Marketing. Journal of Marketing 36:46-54.
Kovács A, Sikos TT (2016) The Impact of Sunday closure on consumer behavior. Romanian Review of Regional Studies 12(2):39-50.
Lowe M (2005). The regional shopping centre in the inner city: a study of retail-led urban regeneration. Urban Studies 42(3):449-470.

Mazzucato M (2018). Mission-Oriented Research & Innovation in the European Union. European Commission, Research and Innovation. Available at: https://www.obzor2020.hr/userfiles/Mazzucato%20Report%20Missions_2018.pdf

Paparelli R, Del Duca M (2010). Centri commerciali naturali. Strategia e strumenti di network marketing a servizio del commercio, del turismo e del terziario. Angeli, Milano.

Pilat D (1997). Regulation and Performance in the Distribution Sector. OECD Economics Department Working Papers 180, OECD Publishing. Available at: https://www.oecd-ilibrary.org/content/paper/121136556730

Price J, Yandle B (1987). Labor markets and Sunday closing laws. Journal of Labor Research 8(4):407-414.

Ravazzoni R, Panciroli A (2002). Caratteri strutturali e dinamiche evolutive nel sistema distributivo italiano. In: Il cambiamento della distribuzione in Toscana negli anni Novanta: verso nuovi profili di modernità. A. Burresi (eds.). Franco Angeli.

Reimers V, Clulow V (2009). Retail centres: it's time to make them convenient. International Journal of Retail and Distribution Management 37:541-562.

Skinner H (2008). The Emergence and Development of Place Marketing's Confused Identity. Journal of Marketing Management 24:915-928.

Skuterud M (2005). The Impact of Sunday Shopping on Employment and Hours of Work in the Retail Industry: Evidence from Canada. European Economic Review 49(8):1953-1978.

Somma A (2013). Scontro tra capitalismi, crisi del debito e diritti fondamentali. In: Diritto pubblico comparato ed europeo. 2:451-466.

Tanguay GA, Upton R (1986). Coming to terms with Sunday working. Personnel Management 18:28-32.

Tanguay GA, Vallée L, Lanoie P (1995). Shopping Hours and Price Levels in the Retailing Industry: A Theoretical and Empirical Analysis. Economic Inquiry 33(3):516-524.

Zukin S (2012). The social production of urban cultural heritage: Identity and ecosystem on an Amsterdam shopping street. City, Culture and Society 3(4):281-291.

ACADEMIC JOURNALS
expand your knowledge

African Journal of Business Management

Full Length Research Paper

The effects of organizational learning on the security of banking's information system in Indonesia

Said Herry Safrizal and Marjulin*

Politeknnik Negeri Lhokseumawe, Indonesia.

Organizational learning improves the security of information system. This study aimed to test and prove whether organizational learning had an effect on the security of information system. Data was gathered through survey, by administering questionnaires to public banks in Indonesia, and was tested using SEMPLS. This study employed explanatory research methodology. The findings showed that insecure information system was found to be the result of unoptimized organizational learning. In other words, organizational learning is a determining factor for a sufficient information system security.

Key words: Learning organization, security of information system.

INTRODUCTION

Eroğlu and Cakmak (2016) argue that security is a measure implemented to examine an entity's maturity in determining the potential risks and solutions for information system. Since information security cost in implementing new technology affects the external financial report and internal decisions, security is critical in creating quality information (Davis, 1996). Loch et al. (1992) note that the biggest risk to information system security comes from inside the enterprise. Furthermore, Spears and Barki (2010) found that at least half of information security breach cases was perpetrated by internal personnel. Users of enterprise's information system are often involved in risky behaviors that may harm the security and integrity of the organization, threaten to publish sensitive information, and weaken the publicly available technological security (Cox, 2012).

Security is indispensable. Security of information system is a measure to protect information from both internal and external threats (Albrechtsen, 2015). Because the majority of information systems are designed and made more flexible so that they are easily accessed by all groups, the impact on information system security becomes more lenient, so that it affects the security of the resulting information system, consequently system security will guarantee confidentiality, data integrity (integrity), and guaranteed availability of information when needed; availability also has an impact (Lachapelle and Bislimi, 2013). Wide-networked enterprises are prone to security risks, particularly on their application (Curtis and Cobham, 2008). Hence, system security needs to be more generally focused, involving more than mere antivirus and network security. It also needs to focus on the security of business transactions that involve valuable data. Information system design must be reliable and effective. It must implement the principle of timeliness and must be able

*Corresponding author. E-mail: julin_fira@yahoo.co.id.

to satisfy the required needs and quality. Information system must be affordable and secure (Bodnar and Hopwood, 2010).

Figure 1 displays the graph of bank security breaches by internal perpetrators based on the 2015 data from Indonesia's Banking Financial Service Authority.

Today's security problems involve highly-flexible security risks. Thus, security design must evaluate all aspects pertaining to system security and human factor in security policies (Solic et al., 2015). In other words, the problems of information security system are more than mere technological problems. The core of those problems is the human element. To identify risks in achieving and maintaining competitive advantages in a rapidly-changing business environment, organizational learning is highly crucial (Marquardt, 2002).

Ifinedo (2014) found that management can improve information system security by providing an environment in which individuals can learn organizational values. In line with that, Tan et al. (2010) argue that organizational learning is a process of learning from security incidents, in which compliance is the key to develop an effective security strategy.

Similarly, Schneider et al. (2012) note that organizational learning is a prerequisite for achieving better security in an organization. Furthermore, Cho (2007) argues that organizational learning involves a more intrinsic concept. To encourage system effectiveness review, an organization with good learning orientation will facilitate the implementation of new system.

The results of the research that have been done stated the need for effective learning to achieve a good system security situation, the problems that exist in Indonesia in particular and developing countries in general, organizational learning is still a problem that needs full attention.

In Indonesia in particular the strengthening of human resources through learning is still a problem that must be quickly addressed by the government (Baderi, 2014). Furthermore, Baderi (2014) said that the quantity of Indonesian human resources is indeed very young, but quality is still minimal, even the competitiveness of Indonesian human resources is still inferior to neighboring Malaysia. The same thing was also stated by Yanuar (2015) who stated that the level of education was still low with various problems; especially the quality of human resources needed attention and had to be addressed immediately.

LITERATURE REVIEW

Organizational learning is a process of knowledge acquisition and information implementation to adapt to changing situations. For an organization, learning involves knowledge acquisition, information dissemination, information interpretation, and organizational retention which successfully adapt itself to changing conditions. To put it simply, organizational learning involves behavioral changes based on organizational and personal experiences (Schermerhorn et al., 2010: 416).

Coghlan and Rashford (2006) argue that organizational learning is the process of learning aggregate on individual, teams, departments, and organizational levels. Organizational learning is defined as organizational ability to create, acquire, interpret, transfer, and disseminate knowledge, aiming to modify behaviors to reflect new knowledge and insight (Garvin, 2000: 11).

Organizational learning is based on the basic principles of learning, that is, acquiring and gathering information, interpreting it, and acting based on the interpretation of information (Garvin, 2000: 13). Organizational learning provides the principles and foundations for learning organization (Cleveland and Plantrik, 1995). Therefore, organizational learning is also described as a series of organizational behaviors that reflects a commitment to continuously learning and improvement.

Senge (1994: 3) notes that organizational learning has a strong orientation towards human resources. Furthermore, Baldwin et al. (1997) argue that members of all levels of an organization, not just the top management, continuously observe their environment to obtain key information; to change strategies and programs as needed to benefit from environmental changes, and to act with continuously improved methods, procedures, and evaluation techniques. Organizations that are willing to experiment and able to learn from their experiences will be more successful than those who are not (Wheelen and Hunger, 1986: 9).

Organizational learning is a vision of how an organization can become an ideal organization (Kofman and Senge, 1995) using five fundamental disciplines, each of which contributes to improving the organization's life and learning capacity. The five disciplines are personal mastery, awareness of mental models, building a shared vision, team learning and system thinking.

Boydell and Leary (1996) and Chaston et al. (1999) used and tested organizational learning model, which correlated with implementation, improvement, and integration, using 21 scale items from five dimensions: clear vision and mission, leadership commitment and empowerment, experimentation, knowledge transfer, and group problem solving. Baker and Sinkula (1999) measured and tested learning orientation using 18 items from three dimension, that is, commitment to learn, shared vision, and open-mindedness. Khandekar (2005) used 9 items to measure learning in its correlation with human resources activities. The nine items were: human resources strategy, training and education, performance evaluation, reward and incentive, conducive condition, work team, knowledge creation, management quality, and flexibility.

Burglary offender
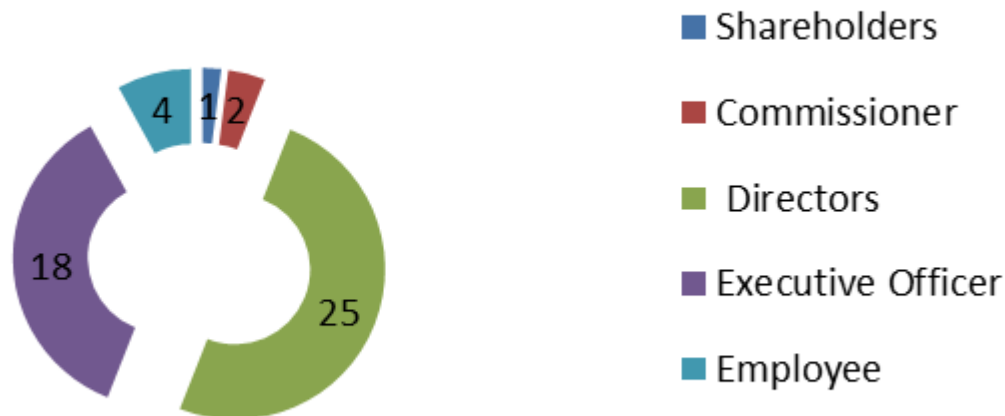
Figure 1. Burglaries in Indonesian Banking.
Source: OJK Financial Report (2015).

Table 1. Summary of second order validity tests on organizational learning variable.

Dimension	Factor weight	R^2	Error variance	T	CR	AVE
Thinking system	0.798	0.637	0.363	17.026		
Mental model	0.725	0.526	0.474	9.029		
Personal mastery	0.753	0.567	0.433	13.249	0.883	0.342
Team work	0.839	0.704	0.296	26.774		
Shared vision	0.647	0.418	0.582	9.152		

Information system security

Organizational dependence on information system keeps increasing. Information system security has become a critical issue for management in securing the organization, information system, and security risks caused by various interrelated internal and external factors (Feng et al., 2014). Anderson (2003) and Dhillon and Torkzadeh (2006) state that information system security is high-quality information which ensures that the risk from information source is appropriate to technical control, administration, and behaviors of the organization. Thus, information system security has become a core business process in any organization (Trcek, 2003).

Information system security can be viewed from risk-minimizing perspective. It means that information system security minimizes the risks that occur from inconsistent and incoherent behaviors in handling organizational information (Dhillon, 1995). This has caused an increase in concerns about organizational information assets protection (Dhillon and Backhouse, 2000). Todorov (2007: 1) sees information system security as an IT security; that is, information knowledge protects the assets from threats. Information asset is the smallest part of organizational or personal valuable information. The security of an information system is an attempt to protect the information system from various disturbances of people who want the information system to be damaged or broken, so that the information generated from the system is of quality (Table 1).

Garfinkel (1995) proposes that information system security covers four aspects: Privacy/Confidentiality, Integrity, Authentication, and Availability. Warkentin (2006: 10-11) argue that information system security is comprised availability, integrity, confidentiality, and authenticity elements. In line with this, Rathore (2004: 75) notes that information system security depends on three main criteria, that is, confidentiality, integrity, and availability (Table 2).

METHODOLOGY

This study employs descriptive and explanatory research methods. Sekaran and Bougie (2016: 123) argue that explanatory research is a study conducted to gather descriptions and systematic, factual, and accurate overview of facts, attributes, and correlation between variables. Organizational learning is the process of instilling in all members of organization the skills to identify problems and to find new ways to solve them in order to improve organizational effectiveness (Schermerhorn et al., 2010; Gephart and Marsick, 2016; Christensen et al., 2007). Based on various literatures and

Table 2. Summary of second order validity tests on information system security variable.

Dimension	Factor weight	R^2	Error variance	T	CR	AVE
Confidentiality	0.950	0.902	0.098	64.646		
Integrity	0.907	0.823	0.177	43.243	0.913	0.545
Availability	0.864	0.746	0.254	29.029		
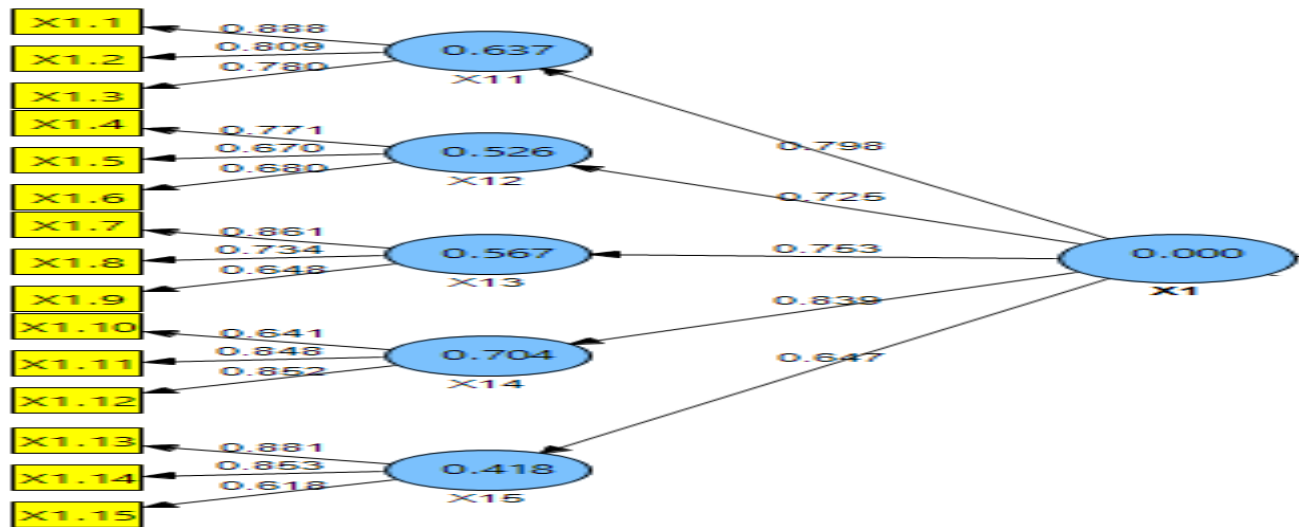
Figure 2. Path diagram of the measurement model for organizational learning variable.

theories, the concept of organizational learning is defined as appropriate and accurate data that supports information system security. Organizational learning in this study refers to learning process implemented by an organization to support its information system security.

Information system security is defined as all activities/processes of protecting information system and data contained in it from threats or misuse from unauthorized parties (Dhillon and Torkzadeh, 2006; Smith and Jamieson, 2006; Bodnar and Hopwood, 2006; Hall, 2011; Kim and Solomon, 2012; Laudon and Laudon, 2012).

Hypotheses

The hypothesis proposed in this study is that organizational learning has positive effects on information system security. The statistical hypotheses are:

$H_0 : \gamma_{11} \leq 0$; Organizational learning does not have positive effects on information system security.
$H_1 : \gamma_{11} > 0$; Organizational learning has positive effects on information system security.

The statistical test used in this study is:

$$t = \frac{\hat{\gamma}_{11}}{S_\mathcal{B}(\hat{\gamma}_{11})}$$

The test criterion is that H_0 is rejected if the p-value is smaller than the real value with a confidence level of 95% or an error rate of 5%.

FINDINGS AND DISCUSSION

Organizational learning is measured through 5 (three) dimensions, which are operationalized into 15 (fifteen) indicators. Data processing using second order confirmatory factor analysis yields a measurement model for the latent variable of organizational learning, as shown in Figure 2.

Information system security is measured through 3 (three) dimensions, which are operationalized into 9 (nine) indicators. Data processing using second order confirmatory factor analysis yields a measurement model for the latent variable of information system security, as shown in Figure 3.

The effect of organizational learning on information system security can be displayed as shown in Figure 4. Organizational learning is hypothesized to affect information system security. Table 3 displays the result of significance test of that hypothesis, using the following statistical hypotheses:

$H_0 : \gamma_{11} \leq 0$; Organizational learning does not have positive effects on information system security.
$H_1 : \gamma_{11} > 0$; Organizational learning has positive effects on information system security.

In Table 3, it can be seen that t_{calc} of organizational
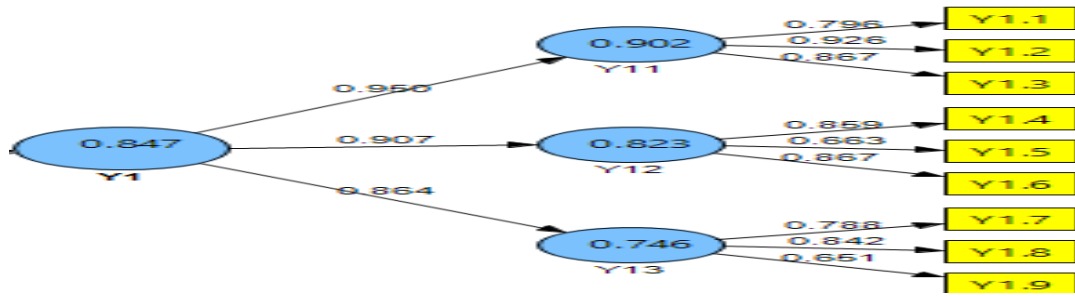
Figure 3. Path diagram of the measurement model for information system security variable.
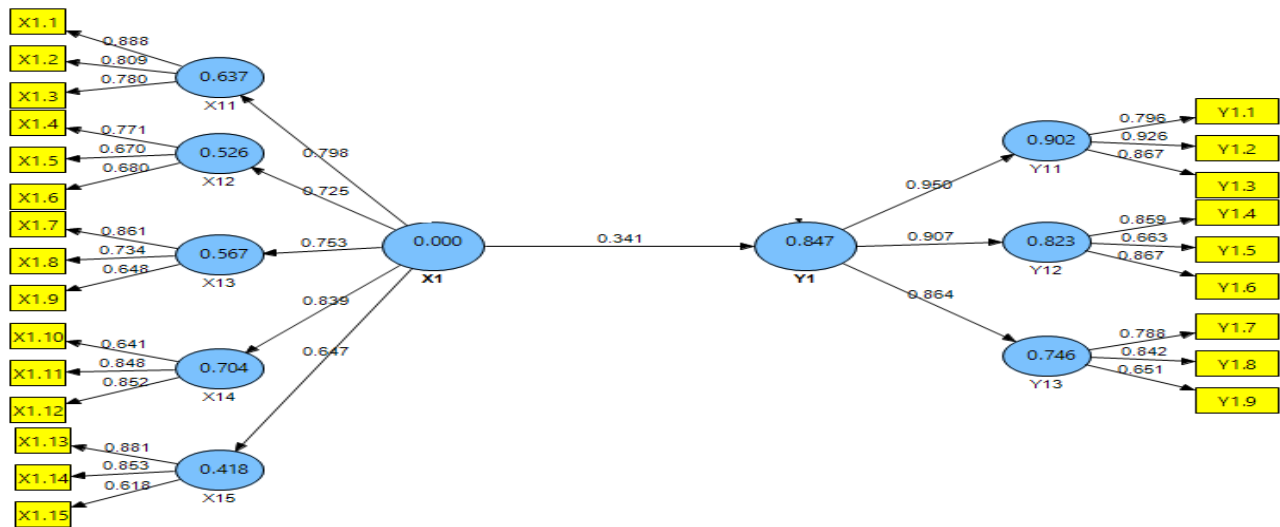
Figure 4. Path diagram of organizational learning's effect on information system security.

Table 3. Test Result of Organizational Learning's Effects on Information System Security.

Path Coef.	t_{calc}	t_{crit}	H_0
0.341	4.478	1.64	Rejected

learning variable (4.478) is greater than the t_{crit} (1.64). Since t_{calc} is greater than t_{crit}, on error variance of 5%, H_0 is rejected. Based on this result, it is concluded that organizational learning has significant and positive correlation to information system security in public banks. Considering the positive path coefficient, this finding provides an empirical evidence that the higher the level of organizational learning is, the greater the information system security will be. Organizational learning has a direct effect of 11.6% on information system security. To find the effect of size of organizational learning on information system security, the f^2 value is calculated. Data processing reveals that without organizational learning variable, the effect of users' competence and managerial commitment on information system security is 0.802. Hence, the f^2 value for organizational learning variable is:

$$f^2 = R^2_{included} - R^2_{excluded} / 1 - R^2_{included} = 0.847 - 0.802 / 1 - 0.802 = 0.294$$

f^2 is 0.294, indicating that organizational learning has moderate effects on information system security.

CONCLUSION AND RECOMMENDATIONS

Organizational learning positively correlates to information

system security because there are still some operational managers who do not get the opportunity for self-development because of a limited system of thinking, this limitation impacts that the limitations of the mental model of the manager will be disrupted, the impact on mastery of the manager is limited so that teamwork is not good, the concept is hampered from building a future vision of organization, the impact on members of the organization do not understand the assignment, especially to protect the information system from attacks/threats from external and internal parties who want to damage the information generated by the organization.

The results of this study support the research of Bartnes et al. (2016) who say that learning will enable organizations to improve response practices for incidents. Mattia (2011) said learning can help organizations to adapt and manage the process of securing organizational assets, and Kovacich (2016) states that system security is one of the fastest growing things now, the internet as a core infrastructure is the target of attacks, so organizations must have knowledge which is good for dealing with cyber-attacks through learning.

This study recommends improving organizational learning by implementing central banking policies concerning opportunities of self-improvement through further education and sustainable learning for members of banking institutions, and by formulating strategic plans for them to participate in seminar/workshops on information system security, to improve their understanding. In addition, banks are expected to implement the results of seminars and comparative study that are applicable to their organization.

Information system security improvement can be done by equipping the security system with firewalls, hiring information system security experts, developing secure applications that are readily applicable and adaptable to changing environment, and providing intensive instruction and trainings in information system security for members of the organization so that they will be able to handle any risks and threats to information system security.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Baderi F (2014). Low Quality of Indonesian Human Resources - New Government Challenges. http://www.neraca.co.id/article/45436/

Albrechtsen E (2015). Major accident prevention and management of information systems security in technology-based work processes. Journal of Loss Prevention in the Process Industries 36:84-91.

Anderson JM (2003). Why we need a new definition of information security. Computers and Security 22(4):308-313.

Baldwin TT, Danielson C, Wiggenhorn W (1997). The evolution of learning strategies in organizations: From employee development to business redefinition. Academy of Management Perspectives 11(4):47-58.

Baker WE, Sinkula JM (1999). Learning orientation, market orientation, and innovation: Integrating and extending models of organizational performance. Journal of Market-focused Management 4(4):295-308.

Bartnes M, Moe NB, Heegaard PE (2016). The future of information security incident management training: A case study of electrical power companies. Computers and Security 61:32-45.

Bodnar GH, Hopwood WS (2006). Accounting Information Systems, Tenth Edition. Upper Saddle River, New Jersey 07458: Pearson Education Inc.

Bodnar GH, Hopwood WS (2010). Accounting Information System (10th edition). United State America: Pearson Education Inc.

Boydell T, Leary M (1996). Identifying training needs (training essentials). London: CIPD.

Chaston I, Badger B, Sadler-Smith E (1999). Organisational learning: research issues and application in SME sector firms. International Journal of Entrepreneurial Behavior and Research 5(4):191-203.

Cho V (2007). A study of the impact of organizational learning on information system effectiveness. International Journal of Business and Information 2(1):127-158.

Christensen T, Lægreid P, Røvik KA (2007). Organization theory and the public sector: Instrument, culture and myth. Routledge.

Cleveland J, Plastrik P (1995). Learning, learning organizations, and TQM. Total Quality Management--Implications for Higher Education", College and University Personnel Association, (Forthcoming 1994).

Coghlan D, Rashford NS (2006). Organizational change and strategy: An interlevel dynamics approach. Routledge.

Cox J (2012). Information systems user security: A structured model of the knowing–doing gap. Computers in Human Behavior 28(5):1849-1858.

Curtis G, Cobham D (2008). Business information systems: Analysis, design and practice. Pearson Education.

Davis CE (1996). Perceived security threats to today's accounting information systems: a survey of CISAs. IS Audit and Control Journal 3:38-41.

Dhillon G, Backhouse J (2000) Information system security management in the new millennium. Journal Communications of the ACM 43(7):125-128.

Dhillon G (1995) Interpreting the Management of Information Systems Security: Doctoral dissertation. London School of Economics and Political Science.

Dhillon G, Torkzadeh G (2006). Value-focused assessment of information system security in organizations. Information Systems Journal 16(3):293-314.

Eroğlu Ş, Çakmak T (2016). Enterprise information systems within the context of information security: a risk assessment for a health organization in Turkey. Procedia Computer Science 100:979-986.

Feng N, Wang HJ, Li M (2014). A security risk analysis model for information systems: Causal relationships of risk factors and vulnerability propagation analysis. Information Sciences 256:57-73.

Garfinkel S (1995). PGP: Pretty Good Privacy: O'Reilly and Associates, Inc.

Garvin DA (2000). Learning in Action: A Guide to Putting the Learning Organization to Work. Boston, Harvard Business School Press.

Gephart MA, Marsick VJ (2016). Using Strategic Leverage Through Learning© to Address Organizational Challenges. In Strategic Organizational Learning. Springer, Berlin, Heidelberg. pp. 163-176.

Hall JA (2011). Accounting Information Systems Seventh Edition: South Western Cengage Learning, a part of Cengage Learning USA

Ifinedo P (2014). Information systems security policy compliance: An empirical study of the effects of socialization, influence, and cognition. Information and Management Journal 51:1.

Yanuar RY (2015). Causes of Labor Productivity in Indonesia Low. Available at: http://ekbis.sindonews.com/read/1072141/34/

Khandekar S (2005). Organizational learning in Indian organizations: a strategic HRM perspective. Journal of Small Business and Enterprise Development 12(2):211-226.

Kim D, Solomon MG (2012). Fundamentals of information system security. Jones and Bartlett learning book and product are available through most bookstrores and online book sellers.

Kofman F, Senge PM (1995). Communities of Commitment: The Heart of Learning Organizations, Learning Organizations Chawla S, Dan J (eds.), Renesh, Oregon Productivity Press.

Kovacich GL (2016). The Information Systems Security officer's

Guide: Butterworth-Heinemann. USA.

Lachapelle E, Bislimi M (2013). ISO/IEC 27002. Information Technology Security Techniques Code Of Practice For Information Security Controls: International Standard ISO/IEC 27017.

Laudon KC, Laudon JP (2012). Management Information Systems Managing the Digital Firm Twelfth edition. by Pearson Education, Inc., Upper Saddle River, New Jersey, 07458.

Loch KD, Carr HH, Warkentin ME (1992). Threats to information systems: today's reality, yesterday's understanding. Mis Quarterly 1992:173-186.

Marquardt MJ (2002). Building the Learning Organization. New York: McGraw-Hill Companies, Inc.

Mattia A (2011). Utilizing a learning loop framework in IS security. International Journal of Business and Social Science 2:21.

Rathore B (2004). Information Systems Security Assessment Framework (ISSAF). Open Information Systems Security Group.

Schermerhorn JR, Hunt JG, Osborn RN, Uhl-Bien N (2010). Organizational Behavior (Elevent Edition). New York: John Wily and Sons. Available at: https://www.abebooks.com/book-search/author/uhl-bien-mary-schermerhorn-jr-john-r-osborn-richard-n/

Schneider K, Knauss E, Houmb S, Islam S, Jürjens J (2012). Enhancing security requirements engineering by organizational learning. Requirements Engineering 17(1):35-56.

Sekaran U, Bougie R (2016). Research methods for business: A skill building approach. John Wiley and Sons.

Senge PM (1994). The fifth discipline: the art and practice of the learning organization, 2nd edn. Bantam Doubleday.

Smith S, Jamieson R (2006). Determining key factors in e-government information system security. Information Systems Management 23(2):23-32.

Spears JL, Barki H (2010). User participation in information systems security risk management. MIS Quarterly 34(3):503-522.

Solic K, Ocevcic H, Golub M (2015). The information systems' security level assessment model based on an ontology and evidential reasoning approach. Computers and Security 55:100-112.

Tan TC, Ruighaver AB, Ahmad A (2010). Information security governance: When compliance becomes more important than security. In: IFIP International Information Security Conference pp. 55-67.

Todorov D (2007). Mechanics of user identification and authentication: Fundamentals of identity management. Auerbach Publications.

Trcek D (2003). An integral framework for information systems security management. Journal Computers and Security 22(4):337-360.

Warkentin M (2006). Enterprise Information Systems Assurance and System Security: Managerial and Technical Issues: Managerial and Technical Issues. IGI Global.

Wheelen TL, Hunger JD (1986). Strategic management and business policy. Addison-Wesley.

African Journal of Business Management

Full Length Research Paper

Effect of human capital accounting on earning per share of equity owners of deposit money banks in Nigeria

OLAOYE Clement Olatunji[1]* and AFOLALU Anthony Buyide[2]

[1]Department of Accounting, Ekiti State University, Ado-Ekiti, Ekiti, Nigeria.
[2]Bursary Department, the Federal Polytechnic, Ado-Ekiti, Ekiti, Nigeria.

The study examined the effect of human capital accounting on Earning per Share (EPS) of deposit money banks in Nigeria. Secondary data were collated from annual reports of the sixteen deposit money banks listed on the Nigerian Stock Exchange between 2006 and 2017. The study employed static panel data of fixed and random effect to explore the relationship between human capital accounting and EPS of deposit money banks in Nigeria. Post estimation test (Hausman Test) was also conducted to select the best and most consistent estimator. Random effect was selected to achieve the stated objective. The results of the random effect revealed that the pension and training and development have significant positive relationship with EPS while other salaries and wages have insignificant positive relationship except director's remuneration (RENMR) that has insignificant negative relationship with EPS. This also implies that training and development, and pension are critical factors that are germane to human capital accounting to boost the earning per share so as to enhance the performance of the banks. The reported adjusted R-Square of value of 0.3876 which is 39% of the systematic variation of the EPS of the firms could be jointly explained by the salaries and wages, training and development, director's remuneration and pension. Based on these finding, the management of banks should give priority to payment of pension and also engage in continuous training and development of their employees to enjoying better EPS.

Key words: Human capital accounting, Earnings per Share (EPS), banking industry, panel data.

INTRODUCTION

Human capital accounting measures and reports cost and value of employers as organizational assets (Jasrotia, 2004). Human capital accounting is a method of managing the employees so that they contribute significantly to the overall productivity of the organization. In attempt to achieve organizational objectivity, it is important to evaluate the value and efficiency of human capital.

Human capital accounting defines the structure of organization which drives the productivity of such organization, and also develops the effective coordination and communication within the organization. Human

*Corresponding author. E-mail: clementolaoye@eksu.edu.ng. Tel: 2348064406376.

capital accounting also gives time to finding the right staff and developing their skills.

Bassey and Tapang (2012) explained that the breakthrough of any organization depends on the ability and competence of human capital within the organization. Human capital effectively and effectively optimizes other resources to achieve the organizational objectives; hence human capital is the most important assets that organization can have. They also explained that human capital is has been as one of the greatest mechanism of gaining competitive advantage by organization in today economy. Human capital accounting was developed to subdue the weakness of traditional accounting system where all investment in human capital were written off as expenses in the year it is measured. Akintoye (2005) pointed out that that essential accumulation of goodwill in an organization can be the function of a well-managed business environment by experience managers who spent enough time to understand organizational policies, politics and ethical values. Human capital accounting is useful in both the business organizations and the society at large. Business organizations are now spending huge sum of money on training, re-training, selection and development of personnel to make them meet the challenges or tasks arising from their day to day running of the business. Human capital accounting creates organization that is more intelligent, flexible and competent than their rivals by applying policies that focus on training and developments of personnel (Adegoroye et al., 2012)

Banking sector is an important industry in Nigeria which contributes towards her economic growth. The issue of human capital accounting in banking industry is all about investing to improving all the skills, innovation and technical ability of the personnel to improve productivity (Adegoroye et al., 2012). Therefore, there is a need for human capital accounting to help management cope with challenges that may confront business organizations.

The sufficient acknowledgement of human capital accounting will enable managers take appropriate decision regarding investment in human capital and provide information regarding benefits assets associated with investment in human capital.

Equity owners own the share of the firms. Equity owners expect capital appreciation on their shares in form of increase in the market value of their shares. Any firm that will achieve capital appreciation must have improved earnings; there is a positive correlation between firms Earnings per Share (EPS) become a yard stick for determining the future prospect of a firm. EPS is that part of firm's profit allocated to each outstanding ordinary shares. EPS is very important to the would be investors in taking decision on whether to invest or not to invest in a particular firm. EPS has been made mandatory to all companies to be disclosed in their annual financial statements.

Human capital accounting improves the quality of personnel in an organization. The higher the quality of personnel in an organization the higher the finance of the organization.

Therefore, there is a positive link between human capital accounting and financial performance (earnings) of firms.

There are still mixed results on the relationship between human capital accounting and EPS. Ruparelia and Njuguma (2016) reported that there is no relationship between human capital accounting and EPS, while Agbiogwu et al. (2016) reported that there is a positive relationship between human capital accounting and EPS. The effect of human capital accounting on EPS is still controversial.

Based on this backdrop, this study intends to fill this missing link. The study therefore examines the nexus between human capital accounting and EPS of deposit money banks listed on the Nigerian Stock Exchange.

LITERATURE REVIEW

Human capital accounting

Human capital accounting is defined as the process of acquiring, training, managing, developing, and retraining, of employees for them to contribute efficiently and effectively to the performance of the organization in other word it is the upgrading the existing skills of the employees and extracting best from them. Human capital accounting according to Jeroh (2013), it is the act of identifying and reporting the investment made a human capital of a firm that are currently not accounted for in conventional accounting practice. It includes identification of costs measured by organization to select, recruits, train, hire and develop its employees.

Okpala and Chidi (2010) examined the importance of human capital accounting to stock investment and decision in Nigeria and the findings or the study revealed that corporate success depends on the ability and knowledge of people who can easily adapt to technology changes. They also found out that the function of human capital accounting is to provide information that enables investors to evaluate and understand the true financial position of organization.

Jelil et al. (2014) reported that value of human capital should be included in the statement of financial position.

Earnings per share (EPS)

EPS is the part of a company profit allocated to each outstanding share of common stock. Farah et al. (2016), explained that EPS represent company's profitability. A company with positive trend of EPS means that the company is generating an improved amount of earnings. A decline trend in EPS is an indication that there is a

problem with the company earnings which can lead to reduction in the stock price.

Human capital theory

This theory was proposed by Schultz (1961) and developed by Becker (1964); the theory claimed that training improved the competence and productivity of workers. The theory also suggested that all expenditure incurred on training, education and development of employees should be treated as investment.

Training improves the skill of employees which in turn enhance corporate competitive advantages and performance. Competitive advantage is achievable when an organization has workers that cannot be imitated by its rivals (Barney, 1991). Organization attracts and retails workers when employees are trained and developed. Human capital theory suggests that the level of education and training of employees are positively correlated to their performance (Becker, 1993).

Sweetland (1996) concluded that the theory predicts that investment in people will be beneficial to the individuals and the organization as a whole.

Human capital as a strategic asset, and is the asset that enables organization to increase their performance.

Empirical literature

Moore (2007) suggested that human capital accounting should be considered when making decision about acquisition and disposal of employees. Accounting practice of the company should encourage valuation of human capital companies to acknowledge the contribution of employees but never treat human capital as asset; the way other physical assets were treated in their books of account.

Ting and Lean (2009) carried a study in Malaysia on the relationship between intellectual capital and financial sector for the period 1999 to 2007. Value added intellectual capital (VAIC) was used as proxy for human capital while return on assets was also used as proxy for financial performance. The findings of the study revealed that value added intellectual capital and return on assets are positively related.

Elahi and Shahaei (2010) carried out investigation on the effect of intellectual capital on performance of the branches of Sepal Bank in Tehran. Multiple regression analysis was employed to test the hypothesis. Findings of the study revealed that intellectual capital has a positive effect on the performance of the bank.

Abubakar (2011) examined the relationship between human resources accounting and the quality of financial reporting of quoted service companies in Nigeria.

The data collected were analyzed using Kendall coefficient of concordance (KKC) and Pearson's Chi-square techniques. KKC was employed to evaluate the concordance of selected experts regarding the nature and characteristics of human capital expenditure and the necessity for their capitalization. Pearson's Chi-square was used to ascertain the perception of questionnaire respondents on the effect by reporting human capital value as asset could have on the ability of financial statements user to make informed decision. The findings of the study revealed that the nature and characteristics of investments on human capital qualified them to be capitalized like other physical assets rather than expensed.

Bassey and Tapang (2012) examined the effect of human capital costs on corporate productivity of ten selected firms on the Nigeria stock exchange. Structured questionnaire was administered to collect data. Multiple regression analysis was used to test the hypothesis of the study. Finding showed that there is a positive and significant relationship between human capital accounting and financial performance of selected firms.

Sojka (2015) carried out a study on the relationship between human resources management practices and firms finance performance. The research studies the links between human resources management practice and economic performance of a sample of 102 organizations in Slovakia, studying basic management practices such as strategy, organizational structure, corporate culture and operational management. The study reveals a positive correlation between HR practice and economic performance.

Ruparelia and Njuguna (2016) studied the relationship between board remuneration and financial performance of Kenya financial service industry. Secondary data were obtained from audited financial statements of service industry of firms listed on Nairobi securities exchange for eleven years for period between 2003 and 2013. Board remuneration was measured by director annual fees while financial performance was measured by return on assets (ROA), return on equity (ROE), dividend yield (DY), and EPS. Linear regression was used on pooled cross-sectional time series data. The result of the study revealed that there was a significant relationship between board remuneration and ROA while there is no significant EPS.

Agbiogwu et al. (2016) studied the effect of human resources costs on profitability of banks in Nigeria, from 2010 to 2014. First Bank of Nigeria Plc. and Zenith Bank of Nigeria Plc. were selected for the study. Content method analysis and linear regression model were used to test the hypotheses. Results showed significant effect on EPS, net profit margin, and return in capital employed by the banks (Appendix).

Asika et al. (2017) carried out study on the appraisal of human resources accounting on the profitability of corporate organizations in Nigeria.

The study used increase in staff salary, increase in staff and staff retirement as the proxies for human resources accounting. Ten commercial banks were selected for the

study. Secondary data were collected from the selected banks. T-test statutory tools with aid of SPSS version 20.0 version was used to test the hypothesis. The findings revealed that increase in salary and retirement benefits have positive effects in organizational profitability.

RESEARCH METHODOLOGY

This study adopts the model of Abdul et al. (2014) in their exploratory study of impact of compensation on employees' performance in the banking sector of Pakistan. Their model specified that performance is a function of salaries, welfare and number of employees'. The linear representation of their model is presented as:

$$Hucap_{it} = B_0 + B_1 salaries_{it} + B_2 welfare_{it} + B_3 employee_{it} + U_{it+}$$

The modified model is presented in functional and linear forms as:

$$Y = F (PC, TC, DR, SW, GR)$$

Linear representation of the modified model is as:

$$Y_{it} = B_0 + B_1 PC_{it} + B_2 TC_{it} + B_3 DR_{it} + B_4 SW_{it} + U_{it} \qquad (1)$$

where Y_{it} = profitability of deposit money banks proxied by Earnings per Share (EPS), Hucap = Human Capital, PC = Pension costs for the banks in year t, TC = Training cost for the banks in year t, DR = Directors' remuneration for the banks in year t, SW = Salaries and wages for the banks in year t, U_{it} = Stochastic error terms, t = time period, and i = cross sectional units.

The dependent variables in this study include profitability index (EPS). EPS is fundamental to the bank's performance; it is calculated as net profit after taxes divided by number of share outstanding. The independent variables used in his study are: pension cost (PC), training cost (TC), director remuneration (DR) and salaries and wage (SW).

Pension cost

This is the amount that an organization charges to expense in relation to its liabilities for pension payable to employees.

Training cost

This is the cost measured by organization in educating its employees on how they will improve on their jobs.

Director's remuneration

This is the process by which directors of a company are compensated, either through fees, salary or the use of company's property with approval from the shareholders and board of directors.

Salaries and wages

These are the remunerations paid to employees for work performed on behalf of an employee or services provided. The estimating technique used in this study is the panel data analysis.

Panel data involves fixed effect model and random effect model.

The post estimation test (Hausman test) was conducted to select the best estimator for the study. The diagnostics test such as first order Autocorrelation test was conducted. The application of these techniques on data estimation gathered for this study is to ensure efficient and unbiased estimates having avoided loss of a degree of freedom. The estimation technique is subjective to whether the data is a short panel or long panel.

The data for the study were collected from Secondary sources. The data were collected from annual reports of the sixteen deposit money bank listed on the Nigerian stock exchange. In addition, data was also sourced from scholarly articles from academic journals and some relevant textbooks in the field of the research.

RESULTS AND DISCUSSION

Result of panel unit root tests

The results of the stationary tests conducted on all the data by means of homogenous panel unit root test (Levin-Lin-Chu (LLC)) and heterogeneous panel unit root test (Im peresan and Shin (IPS)) are presented in Table 1. A time series is stated as non-stationary if the mean and variance of the time series are dependent over time. On the other hand, a time series is stationary if the mean and variance is constant over time.

In Table 1, the result reveals that all the series are integrated of different orders. Majority of the variables such as EPS, salary of staff (SALARY), and director's remuneration (RENMR) are stationary at first difference except training of the staff (TRAIN). In view of the aforementioned result, condition for panel cointegration is not met. Therefore, there is need to proceed to fixed effect and random effect panel model.

Panel data analysis

To analyze the relationship between human capital accounting and the profitability of money deposit in the banks, the study employs static panel data analysis of a single equation model of EPS as a proxy for the financial performance to determine the profitability of banking firms. EPS serves as a dependent variable while SALARY, DIRECTOR RENUMERATION, TRAINING and PENSION are the explanatory variables that determine the quality of human resources accounting. In a bid to arrive at the most consistent and efficient estimates, the study conducts unrestricted panel data analyses which include fixed effect and random effect panel estimates, followed by post estimation test such as Hausman test. Hence, result for the estimation is presented in separate tables for unique analysis, before drawing conclusion on the most consistent and efficient estimator.

Objective: Nexus between human resources accounting and EPS

From the Table 2, almost all variables like SALARY, TRAIN and PENSION have positive relationship with

Table 1. Levin-Lin-Chu (LLC) and Imperasan and shin (IPS) unit root test.

Variable	Levin – Lin – Chu (LLC)		Order of integration	Imperasan and Shin (IPS)		Order of integration
	t-statistic	probability		t-statistics	Probability	
EPS	-4.8084	0.000**	I(1)	-2.3231	0.0101***	I(1)
SAL	-2.3672	0.0092**	I(1)	-1.7598	0.0065**	1(1)
RENMR	-3.7747	0.0001**	I(1)	-2.1464	0.0000**	I(1)
TRAIN	-0.2911	0.3855**	I(1)	-1.7997	0,0834**	I(1)
PENSION	-6.8265	0.0000**	I(1)	-1.9899	0.0001**	I(1)

Source: Author's computation (2019).

Table 2. Fixed effect parameter estimate (cross – sectional specific). Series: EPS, PENS, RENMR, SALA, TRAIN.

Variable	Coefficient	Standard error	T – test value	Probability
C	49.337	18.530	2.663	0.0085
PENSION	0.0238***	0.00357	6.669	0.0000
RENMR	-0.0052	0.0080	-0.656	0.5126
SALARY	0.0008	0.0006	1.264	0.2078
TRAIN	0.0148*	0.0079	1.8601	0.0646

R-Squared = 0.4485; Adjusted R – Squared = 0.3876; F – Statistics = 0.0000; Prob (F-statistics) = 0.0000.
***Significant at 1%, **Significant at 5% and *Significant at 10% level of significance.
Source: Author's computation (2019)

Table 3. Random effect of earnings per share. Series: EPS, PENS, RENMR, SALA, TRAIN.

Variable	Coefficient	Standard error	T-test value	Probability
C	51.0920	28.4501	1.7958	0.0741
PENSION	0.0231	0.0034	6.7168	0.0000
RENMR	-0.006901	0.00782	-0.8814	0.3792
SALARY	0.00072	0.00052	1.2569	0.2104
TRAIN	0.01702	0.0077	2.1828	0.0303

R-Squared = 0.24148; Wald Chi^2 (7) = 14.8838. Prob> Chi^2 = 0.0000. ***Significant at 1%, **Significant at 5% and *Significant at 10% level of significance.
Source: Author's computation (2019).

EPS but only PENSION and TRAIN are significant. This implies that TRAINING and PENSION are critical factors that are germane to human resources to boost the EPS as a means to enhance the profitability of the banks. The reported R-Square of value of 0.4485 which is almost 45% of the systematic variation of the EPS of the firms can be jointly explained by the independent variables. The R-Square value is below average indicating that the explanatory variables are fairly fit measures for EPS.

The result in Table 3 is nearly the same with the fixed effect. The finding shows that PENSION and TRAIN have significant positive relationship with EPS while other variables have insignificant positive relationship except director remuneration (RENMR) that has insignificant negative relationship with EPS. This also implies that

TRAINING and PENSION are critical factors that are germane to human resources to boost the EPS so as to enhance the performance of the banks. The reported R-Square of value of 0.24148 which is 24% of the systematic variation of the EPS of the firms can be jointly explained by the independent variables. The R-Square value is low indicating that the explanatory variables are not good fit measures for EPS.

Post-estimation

Since the probability value of the Hausman test is more than 0.05 or 5% level of significance, the null hypothesis is not rejected. Therefore, the random effect is the most

Table 4. Hausman test (EPS).

Null hypothesis	Chi-Square Statistics	Probability
Difference in coefficient not systematic	2.4456	0.6544

Source: Authors' Computation (2019).

Table 5. Testing for serial correlation (Wald Test).

Null hypothesis	Statistics	Probability
Autocorrection	0.13	0.72

Source: Authors' Computation (2019).

appropriate model to assess the relationship between human capital accounting and EPS (Table 4).

Diagnostic test

In order to examine the robustness of the model, diagnostic test is implemented using first order autocorrection test in the model. The result of the serial correlation test revealed that at 5% level, we reject the null hypothesis that there is no autocorrelation in the residuals for any of the orders tested, thus this test finds no evidence of model misspecification. The result is presented in Table 5.

CONCLUSION AND RECOMMENDATIONS

The study examined the relationship between human capital accounting and EPS of deposit money banks in Nigerian stock of exchange. The finding shows that pension and train have significant positive relationship with EPS while other variables have insignificant positive relationship except director remuneration (RENMR) that has insignificant negative relationship with EPS. This also implies that train and pension are critical factors that are pertinent to human resources to boost the EPS so as to enhance the performance of the banks. The finding of the study agreed with finding of Agbiogwu et al. (2016), Therefore, the study concludes that training and development of the staff and pension are good measures of human capital assets that are capable of improving the EPS of money deposit banks. It is also concluded that remuneration of directors is not veritable variable of human capital and not significant to promote EPS of Nigerian banks. Based on these finding, the management of banks should give priority to payment of pension and also engage in continuous training and development of their employees to enjoying better EPS.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Abdul H, Muhammad R, Hafiz MKZ, Ghazanfar A, Muhammad A (2014). Impact of compensation on employee performance: Empirical Evidence from Banking Sector of Pakistan. International Journal of Business and Social Sciences 5(2):302-309.

Abubakar S (2011). Human resource accounting and the quality of financial reporting of quoted service companies in Nigeria. Unpublished Ph.D. Dissertation, Ahmadu Bello University, Zaria, Nigeria.

Adegoroye AA, Oladejo M, Moruf A (2012). Strategic human resources management practices in the post consolidated Nigerian commercial banks. European Journal of Business and Management 35(2):147-165.

Agbiogwu AA, Ihendinitiu JU, Azubike JUB (2016). Effect of human resourcess cost on profitability of banks in Nigeria. Expert Journal of Finance 4(2):10-18.

Akintoye CR (2005). Human resources accounting in service organization: A review and suggested application of model. International Journal of Business Management and Economic Research 3(4):566-575.

Asika ER, Chitom JAR, Chelichi IF (2017). Appraisal of human resource accounting on profitability of corporate organization. Economics 6(1):1-10.

Barney JB (1991). Firm resources and sustained competitive advantage. Journal of Management 17(1):99-120.

Bassey BE, Tapang AT (2012). Expensed human resources cost and its influence on corporate productivity: A study of selected companies in Nigeria. Global Journal of Management and Business Research 12(5):3-8.

Becker GS (1964). Human capital: A theoretical and empirical analysis, with special reference to education, New York; National Bureau of Economic Research distributed by Colombia University Press.

Becker GS (1993). Human capital: A theoretical and Empirical Analysis with special Reference to Education (3rd Ed.). Chicago: University of Chicago Press.

Elahi AK, Shahaei B (2010). Examines the impact of intellectual capital on the performance of bank Sepah in Tehran. Journal of Governance and Management 3(5):73-90.

Farah N, Farrukk I, Faizaan N (2016). Financial performance of firms. Evidence from Pakistan cement industry. Journal of Teaching and Education 5(1):81-94.

Jasrotia P (2004). The need for human resource accounting. Retrieved April, 23, 2013.

Jelil AA, Olotu AE, Omojola SO (2014). Optimizing the effectiveness of financial reporting through human resources accounting. International Journal of Accounting Research 42(1836):1-13.

Jeroh E (2013), Human capital accounting and the comparability of financial statement in Nigeria. Journal of Accounting Management 3(2):53-63.

Moore R (2007). Measuring how 'human capital' appreciates in value over time. Plant Engineering 61(4):29.

Okpala PO, Chidi OC (2010). Human Capital accounting and its

relevance to stock investment decisions in Nigeria. European Journal of Economics, Finance and Administrative Sciences 4(21):13-18.

Ruparelia R, Njuguna A (2016). Relationship between board renumeration and financial performance in the Kenya financial service industry. International Journal of Financial Research 7(2):247-255.

Schultz TW (1961). Investment in human capital. American Economic Review 51:1-17.

Sojka L (2015). Investigation of the relationship between human resource management practices and firm's finance performance. European Scientific Journal 11(34):87-115.

Sweetland SR (1996). Human capital theory: Foundations of a field of inquiry. Review of Educational Research 6(3):341-359.

Ting IWK, Lean HH (2009). Intellectual capital performance of financial institution in Malaysia. Journal of Intellectual Capital 10(4):588-599.

Appendix. Data used for analysis.

Year	Bank	EARN_SHA_Y	RET_ASS_Y	RET_EQU_Y	INT_MA_Y	CAP_ADEQ_Y	SALA_X	ENUM_X	TRAIN_X	PENS_X
2006	ACE	0	0	0	0	0	0	0	0	0
2007	ACE	0.65	1.9	2.42	81	18	2093	235	1113	52
2008	ACE	171	1.8	9	44	34	8936	241	0	151
2009	ACE	130	3.7	11	41	0	10726	246	0	210
2010	ACE	63	2	6.2	48	0	15199	261	0	416
2011	ACE	95	1.5	8	43	22	21726	1320	1369	1519
2012	ACE	187	2.6	16	48	23	26861	2510	1369	1726
2013	ACE	0	0	0	0	0	29567	1600	0	600
2014	ACE	186	2.5	15.5	57	18	29884	0	1278	804
2015	ACE	265	3	18	46	20	39187	0	1862	1811
2016	ACE	250	2.6	22.8	56	20.8	48450	0	1639	1087
2017	ACE	218	1.95	17.7	51	22.5	51643	0	2424	1239
2006	DIAD	59	2.4	11.4	69	0	4107	100	0	705
2007	DIAD	91	2.8	13	64	0	6772	145	0	266
2008	DIAD	118	2.59	10.9	63.4	0	9314	172	0	1280
2009	DIAD	-56	-1.9	-7.7	60	19.5	13028	266	0	1603
2010	DIAD	9	0.82	1.2	75	16.6	14849	342	0	1628
2011	DIAD	0	0	0	0	0	0	0	0	0
2012	DIAD	153	2.3	20.4	64	17.51	19951	188	5249	762
2013	DIAD	197	2.1	21	57	17.99	25567	219	3947	536
2014	DIAD	0	0	0	0	0	0	0	0	0
2015	DIAD	24	4	2.64	50.4	16.4	24307	299	340	726
2016	DIAD	15	0.24	1.5	50.5	15.01	30094	301	1711	729
2017	DIAD	-39	-0.7	-4	52	16.74	22701	271	355	701
2006	FID	0.2	3.03	12.45	38	0	3609	22	0	46.2
2007	FID	0.29	2.34	15.6	35.6	0	4300	11.32	0	178
2008	FID	46	3.05	9.73	73	0	7352	11.32	0	315.1
2009	FID	5	0.7	1.12	64	0	14096	14.11	0	335.5
2010	FID	19	1.8	4.5	66	44	11937	222	0	2819
2011	FID	21	1.04	3.89	37	30	14264	207	0	4873
2012	FID	62	2.33	11	46.6	29	21780	282	0	869
2013	FID	27	0.84	4.8	35	21.77	24231	328	0	1398
2014	FID	48	1.31	7.97	46.8	24	23942	355	0	1932
2015	FID	48	1.34	7.56	50.2	19	0	346	0	0
2016	FID	34	0.85	5.25	50.3	17.23	19125	249	0	561
2017	FID	65	1.47	9.27	47	16.03	21817	370	0	518

Appendix. Cont'd

2006	FCMB	0	0	0	0	0	1788	118	0	152
2007	FCMB	0	0	0	0	0	5697	212	0	323
2008	FCMB	136	4.41	11.3	69	0	10665	351	0	322
2009	FCMB	26	0.93	3.1	56	36.06	14780	316.9	0	389
2010	FCMB	49	1.4	5.89	50.2	30.8	13584	627	0	694
2011	FCMB	-0.68	-1.8	-7.87	59	27	13296	601	0	1472
2012	FCMB	0.66	1.77	12.2	44.7	25	14455	658	3074	318
2013	FCMB	0.81	1.8	11.13	60	18	20729	716	1427	480
2014	FCMB	1.12	2.04	13.8	61.6	19	23427	881	3861	515
2015	FCMB	0.24	7	2.93	51.7	16.88	22060	886	2744	683
2016	FCMB	0.72	1.39	8	55.6	16.54	21244	818	2968	592
2017	FCMB	0.48	0.97	5	53.3	16.88	18460	937	4454	511.6
2006	FIRST	3.32	3.6	28	75.4	19.69	13838	135	0	1507
2007	FIRST	1.75	2.9	24.4	54.6	23.4	18306	516	0	1602
2008	FIRST	50.55	1.38	3.7	68	24.69	31137	549	0	2242
2009	FIRST	10.99	0.53	1	59	15.8	35086	599	0	5518
2010	FIRST	95	1.4	9.6	69	20.4	40675	3669	0	11463
2011	FIRST	140	1.8	13	83	20.5	48655	3294	0	8889
2012	FIRST	230	2.5	18.8	78	21.97	47919	3537	0	20888
2013	FIRST	216	2	15.5	71	17.7	0	0	0	0
2014	FIRST	235	2	16.9	67.3	22.4	76678	6795	0	2954
2015	FIRST	43	0.4	2.7	67	19	77474	6488	0	2639
2016	FIRST	53	0.48	2.1	75	22.6	77148	3483	0	4241
2017	FIRST	143	1.1	5.9	70	15.7	74072	5081	0	3603
2006	GTB	142	3.4	23.5	62.8	0	3284	121	327	165
2007	GTB	0	0	0	0	0	0	0	0	0
2008	GTB	196	3.91	16.51	69	22.56	0	0	0	0
2009	GTB	153	3.26	14.43	65.6	23.55	16644	0	50	658
2010	GTB	136	3.96	18	73.7	23.24	16926	459	662	618
2011	GTB	169	3.86	22.1	78	20.68	18319	467	238	643
2012	GTB	305	5.9	31	76.7	23.8	20756	345	598	806
2013	GTB	317	5.1	27	73.9	21.8	27479	366	993	0
2014	GTB	347	4.94	26.4	71	21.4	25981	512	988	928
2015	GTB	351	4.8	24	70	18.17	26089	542	1910	957
2016	GTB	467	5.3	26	74.4	19.8	27374	669	2386	1007
2017	GTB	603	6	27.3	75.4	25.5	74072	0	0	0
2006	UNI	0	0	0	0	0	0	0	0	0

Appendix. Cont'd

2007	UNI	0	0	0	0	0	0	0	0	0
2008	UNI	0	0	0	0	0	0	0	0	0
2009	UNI	-20.81	-24	-122	41	-13	28489	514	0	1741
2010	UNI	830	3.65	0	58	-9.51	36714	467	105	2243
2011	UNI	-1441	-7.61	-48	44	20.8	33100	946	65	1679
2012	UNI	24	0.3	0.7	73.4	20	33107	1191	59	1115
2013	UNI	32	0.4	1.9	70	25	28820	933	57	1622
2014	UNI	151	2.75	12	68	16.4	27713	310	0	702
2015	UNI	83	1.9	5.7	61	15.3	28336	358	0	644
2016	UNI	92	1.3	5.64	65.2	13.3	29804	354	0	722
2017	UNI	81	1.06	4.2	53.5	17.8	27886	367	0	726
2006	UBA	0	0	0	0	15	0	0	0	0
2007	UBA	261	2.8	16.2	61	22	7199	31	6012	1719
2008	UBA	311	2.9	21	64	22.5	23636	73	11580	1764
2009	UBA	10	0.42	1.27	66.5	16	36777	376	0	1377
2010	UBA	3	0.2	0.33	60	17.2	36000	764	0	1905
2011	UBA	-32	1.47	-5.7	62.3	21.7	35144	980	0	2009
2012	UBA	166	2.4	26.7	61	23.5	42135	37	0	1317
2013	UBA	152	2.1	19.8	55.6	22.6	48977	47	0	1678
2014	UBA	153	20.3	18.1	54	16	53611	31	0	1850
2015	UBA	179	2.5	18	59	20	55394	40	0	2052
2016	UBA	204	2.6	16.1	62.6	20	62385	40	3724	2133
2017	UBA	222	2.6	14.8	64	20	66839	33	1603	2229
2006	ZEN	191	2.5	12.3	72	0	8479	167	0	745
2007	ZEN	202	2.64	16	70	0	31527	314	0	1123
2008	ZEN	383	3.14	15	62.4	36	31912	493	0	2030
2009	ZEN	82	2.1	6.1	56.6	29	43057	745	0	2386
2010	ZEN	0	0	0	0	0	0	0	0	0
2011	ZEN	0	0	0	0	0	0	0	0	0
2012	ZEN	319	4	21.7	71	30	44840	726	849	726
2013	ZEN	301	3.5	18.7	73	26	47974	675	1421	675
2014	ZEN	316	3.2	17.3	65.9	20	55680	630	13132	3499
2015	ZEN	336	3.1	17.8	64.5	21	58595	1145	7438	3488
2016	ZEN	412	3.3	18.4	62.5	23	50820	1057	3215	3525
2017	ZEN	556	3.6	22	54.4	27	53397	1479	4070	3955
2006	CITI	276	9.5	23	84.7	0	1760	106	146	85
2007	CITI	249	6.2	20	82	0	1214	133	180	99

Appendix. Cont'd

2008	CITI	305	6.9	22.6	78	0	2143	133	658	102
2009	CITI	0	0	0	0	0	0	0	0	0
2010	CITI	324	4.5	21.7	79	36	3234	253	1100	114
2011	CITI	348	3.3	22	82	25	3257	259	1232	169
2012	CITI	476	5.22	26.4	71.3	30	3795	37	999	171
2013	CITI	499	4.9	27	76	34	3923	51	1077	172
2014	CITI	566	4.6	29.5	79	21.7	3997	491	0	207
2015	CITI	385	3	17.7	80.1	28.3	4439	48	1110	256
2016	CITI	9.26	5.3	35	86	27.5	4706	60	924	264
2017	CITI	11.7	6.8	36	75	29.5	5571	67	1134	303
2006	ECO	947	3	23	73	19	25200	660	750	32400
2007	ECO	1076	2.8	24	65	15.7	46800	720	1140	34500
2008	ECO	270	1.5	17	55	24.5	75300	894	0	3180
2009	ECO	116	1.1	5.2	60	21.4	73500	750	1860	3300
2010	ECO	228	1.6	10	68	20.8	75300	810	1380	3600
2011	ECO	352	1.62	14.2	66.4	18.6	96300	1410	3510	7200
2012	ECO	340	1.74	13.2	63	19.2	155400	780	2697	10200
2013	ECO	95.3	1	6.9	66	0	0	0	0	0
2014	ECO	281	2.2	15	65.6	0	172800	453	1716	5340
2015	ECO	56	0.9	4.23	65	0	157740	450	885	3600
2016	ECO	-3.1	-0.9	-9.6	66	25.3	4503	0	0	0
2017	ECO	3.06	1.1	11.6	62	29	0	0	0	0
2006	UNITY	0	0	0	0	0	0	0	0	0
2007	UNITY	0	0	0	0	0	0	0	0	0
2008	UNITY	0	0	0	0	0	0	0	0	0
2009	UNITY	-101	-6	-233	36	-12.4	22981	91	0	1365
2010	UNITY	36	4	28	57	11	15512	562	0	843
2011	UNITY	0	0	0	0	0	0	0	0	0
2012	UNITY	16	2	12	61	8	14012	406	0	564
2013	UNITY	-59	-6	-80	58	-14	14464	139	0	629
2014	UNITY	17.5	2.6	20	72.6	2	13361	136	0	522
2015	UNITY	12.34	1.1	6	69	-21.5	13774	397	0	621
2016	UNITY	19	0.5	26	71	47	10982	411	0	651
2017	UNITY	0	0	0	0	0	0	0	0	0
2006	SKYE	33	1.2	18.9	57	19.69	3786	86	0	94
2007	SKYE	76.4	1.8	19.4	70.3	10.44	4775	98	160	291
2008	SKYE	180.5	2.7	16.5	63	16.67	9718	105	183	312

Appendix. Cont'd

2009	SKYE	0.07	0.13	-0.14	48	16.83	16449	171	326	403
2010	SKYE	77	1.8	9.38	64.2	19.6	13209	136	600	1142
2011	SKYE	40	0.31	2.6	58	17.5	12668	209	600	1507
2012	SKYE	101	1.5	12.5	60	16.9	14278	158	621	1949
2013	SKYE	144	1.76	15.3	58.6	19	14608	201	697	2136
2014	SKYE	75	0.74	7.4	59	16	16383	240	476	2259
2015	SKYE	0	0	0	0	0	0	0	0	0
2016	SKYE	0	0	0	0	0	0	0	0	0
2017	SKYE	0	0	0	0	0	0	0	0	0
2006	IBTC	0	0	0	0	0	0	0	0	0
2007	IBTC	49	2.5	10	61	40	8571	508	0	300
2008	IBTC	64	4.16	14.3	54	36	10004	553	0	358
2009	IBTC	43	3	12.8	62	36.8	12919	788	0	550
2010	IBTC	50	3.7	16.5	84	32.6	14267	720	0	631
2011	IBTC	30	2.1	12.2	78	21	17545	618	325	141
2012	IBTC	50	1.9	14.4	58	22.3	19421	142	462	205
2013	IBTC	186	2.9	21	59	22	22393	253	680	1213
2014	IBTC	293	3.2	28	61	19	0	0	0	0
2015	IBTC	195	2.5	2.3	53	18.3	26146	632	730	156
2016	IBTC	246	3.53	3.1	66	21	28957	707	726	975
2017	IBTC	460	4.4	4	68.5	20	33177	774	1126	2925
2006	STAN	0	0	0	0	0	0	0	0	0
2007	STAN	0	0	0	0	0	3926	89	0	269
2008	STAN	18	1.42	7	23	0	5812	96	0	374
2009	STAN	52	3.2	21	46	0	4002	150	0	330
2010	STAN	33	1.4	17	48	13	4064	129	0	395
2011	STAN	35	0.7	20	59	17	6237	160	0	379
2012	STAN	44	1.29	15	44	15	9142	0	0	614
2013	STAN	52	1.3	13	51	14	9844	0	0	425
2014	STAN	42	1.3	10.6	55.2	14	11426	390	556	604
2015	STAN	36	1.4	10.7	49	17.5	10840	198	514	1260
2016	STAN	18	0.72	7	56	11.16	10252	304	449	1270
2017	STAN	30	0.8	8.5	46	12.2	10244	281	728	1301
2006	WEMA	0	0	0	0	0	0	0	0	0
2007	WEMA	0	0	0	0	0	0	0	0	0
2008	WEMA	0	0	0	0	0	0	0	0	0
2009	WEMA	-66	-5.8	-16.4	33	30.3	6546	19370	0	593

Appendix. Cont'd

2010	WEMA	163	6.38	109	41.5	48.83	0	0	0	0
2011	WEMA	-85	-3.38	-114	64	27	5903	107	806	652
2012	WEMA	-42	-2.01	-394	47	-16	5585	110	1636	6092
2013	WEMA	0.9	0.6	3.9	43	27	6084	133	1766	1087
2014	WEMA	6	0.81	5.4	52	18.22	7394	54	1774	612
2015	WEMA	6	0.8	5	48	15	7092	57	1758	628
2016	WEMA	66	0.77	5.3	42	11.07	7529	81	180	571
2017	WEMA	58	0.78	4.5	37	14.32	8162	141	857	580

Source: Author's Compilation (2019).

ACADEMIC JOURNALS
expand your knowledge

African Journal of Business Management

Full Length Research Paper

Supplier selection in global uncertainty: Using a case study approach to identify key criteria required for building resilience in the supply chain

Maleghemi Olusegun C.

The Nest Innovation Technology Hub, Lagos, Nigeria.

The rise in disruptions to supply chain is a major concern to most organizations. Supply chain managers need an innovative framework to respond to them. This research considers the supplier selection stage a strategic point to act. With careful selection, resilience is built in their operations. However, the challenge becomes what criterial factors to consider in the selection process, especially with global uncertainty. This paper makes use of multiple case studies, interviews and literature to answer this question. The result identified four major criteria: Steady information dissimilation via real-time data integration, robust disruption management plan continuously improved with experience, useful cooperation and alliances agreements and the interests of government and their regulators in the sector. The result also identifies issues which procurement managers need to address, internally. In conclusion, it accepts that it is possible to build a system which responds positively and mitigates the effects of disruptions, but this requires redesigning the process of supplier selection, after taking a macro-level re-evaluation of the supply network.

Key words: Disruptions, supply chain, suppliers, resilience, uncertainty.

INTRODUCTION

In a jointly released report by leading researchers done in 2010, Accenture confirmed the "critical importance" of the Supply Chain to 89% of the executives they surveyed (Naslund and Williamson 2010). 51% of those surveyed stated that their investment into Supply Chain Management (SCM) had increased significantly over the last three years. Stock and Boyer (2009) also observed a rapid increase in articles published and dissertations after the initial "surge" in the middle 1990s. The supply chain has thus become one of the most widely discussed subjects amongst organizations.

The supply chain is seen not just as a source of product and services, but also of innovation, information, and competitive advantage (Langley and Holcomb, 1992; Cooper and Ellram, 1993; Lambert, 2008). Some literatures also reveal that the adoption of various supply chain model has translated to increased costs savings and profit boost. This is as a result of improved process performance, reduced redundancies, lower inventory levels, shorter lead time and lessened demand uncertainties (Fisher, 1997; Lee et al., 1997; McCarthy and Golicic, 2002; Lambert et al., 2005; Sabath and

Fontanella, 2002; Naslund and Williamson, 2010). Naturally, most of the recent activities in the study of the Supply Chain have bordered around improving efficiency and effectiveness (McCarthy and Golicic, 2002; Lambert et al., 2005). This is expected, considering the resource spent within the Supply Chain. Reports show that most companies spend as much as 50-80% of their total turnover on supply chain activities (Telgen, 1994).

However, activities within the supply chain do not always proceed as expected. "Events" take place which affect the flow of these components and service along the chain. Regarded as risk, it can be defined as:

"Unexpected events [that] might disrupt the flow of materials on their journey from initial suppliers through to final customers" (Waters, 2007: 7).

When it is negative, the impact could be devastating to the organization's objectives. Martha and Subbakrishna (2002), Kleindorfer and Saad (2005) and Tang and Nurmaya (2010) observed that they do not just stop at delivery delays or shortages but create an increase in expenses due to manpower and resources wasted in communication, co-ordination and monitoring activities. This ultimately affects the objectives of the business and shareholders' earnings. Works from Hendricks and Singhal (2003, 2005) show that the news of a supply chain disruption has a greater negative effect on the share prices of a company's stock than announcements of plan closure, delay in production development or reduction in capital expenditure. Kilgore (2004) also confirmed this. It is understood that most of these studies have revolved around operational risk. These are regularly re-occurring events which tend to be predictable (Brindley, 2004; Wagner and Bode, 2006). Very few have considered uncertainties which are unpredictable. There is a clear difference between risk and uncertainty. According to Waters (2007):

"Risk means we can list the events that may happen and can give each a probability.
Uncertainty means that we can list the events that might happen in the future, but have no idea about which will happen or their relative likelihood" (Waters, 2007: 17).

Tang and Nurmaya (2010) however provided an expansive description:

"…refer to (i) events with small probability but may occur abruptly and (ii) these events bring substantial negative consequences to the system" (Tang and Nurmaya, 2010).

These events that used to be rare have suddenly become commonplace. Also, it tends to negatively affect the supply chain. A typical example is the Taiwan earthquake of September 21, 1999. Unexpectedly, the earthquake affected the Hsinchu Industrial park and sent shock waves through the global semiconductor market (Baum, 1999; Veverka, 1999, Crothers, 1999). The damage caused the supply disruptions of core-components for processors.

A classic case that reflects "accidental" disruptions is the Albuquerque fire at Philips' microchip office on March 17, 2000 (Latour, 2001; Norrman and Jansson, 2004). While the fire may be classified as an accident, the impact meant the disruption to supplies of millions of chipsets for the market. It affected both Ericsson and Nokia. However, while Nokia moved on, by engaging secondary facilities and suppliers, Ericsson did not have the structure in place to respond and could not meet production demands worldwide. Hence, they lost out and eventually had to quit the multibillion-dollar mobile phone sector entirely (Mukherjee, 2008).

These two highlight the importance of having the supply chains prepare for these rare-case events. Very recent research shows that these "low-probability" events are the second and third most reason given by managers for supply chain disruptions. Together, they account for close to 35% of supply chain disruptions. New sets of activities are required to restore the supply chain and ensure that components are delivered to purchasers. According to Tidd and Bessant (2018), this can be achieved through "sophisticated and active management" study. As a result, this research intends to study disruptions, and develop an adoptable framework. To this end, the work attempts to provide answers to the following Research Questions (RQs):

RQ1: How can we identify and select suppliers that will respond positively to disruptions?
RQ2: How can we establish a selection baseline which builds resilience in the supply chain arm of an organization?

Using a case study approach, this article observes supply chain activities in the aftermath of disruptions and attempts to uncover those fundamental criteria to watch out for. The analysis is strategic rather than operational. The focus is on those disruptions caused by unpredictable ecological events and unpredictable accidental incidents.

LITERATURE REVIEW

According to Tang and Nurmaya (2010), it is easy to see two clear activities into risk studies. One school attempts to understand the outcome of risk occurring (Rice and Caniato, 2003; Christopher and Lee, 2004; Hendrick and Singhal, 2005; Spekman and Davis, 2004), while the other looks at finding a holistic action to control and mitigate its effect. This focuses on two areas: Expected (Brindley, 2004, Wagner and Bode, 2006) and Unexpected risk (Christopher and Lee, 2004; Kleindorfer and Saad, 2005; Quinn, 2006, Tomlin, 2006; Deane et

al., 2009). Tang (2006) used the terms "Operation risk", to separate events faced by organizations in their daily activities from "Disruptions". Byrne (2007) argued that most risks are operational and controllable. This article focuses on the uncontrollable. The uncontrollable (Disruptions) are events which are difficult to predict and cannot be controlled or reversed by human activities or intervention. Sheffi (2005) used the words Low-Probability-High-Impact to describe them and classified them into three:

(i) Natural phenomenon (e.g. Fires, Earthquakes)
(ii) Accidents (e.g. technology failures and breakdowns)
(iii) International incidences (terrorism, ill-will by insider/outsiders)

Wagner and Bode (2006) stated that due to the increase of globalization in supply chain operations, local events seem to have increased global repercussions on supplies and businesses. With the overall increased attention, several articles and books have looked at the dealing with disruptions in order to control the negative effect it has (Juttner et al., 2003; Rice and Caniato, 2003; Sheffi, 2005; Waters, 2007, Craighead et al., 2007). Most agree that there are peculiar challenges in dealing with disruptions: Because these events rarely occur, it is impossible to recommend building costly systems or implementing strategies that erode business profitability. In general, most authors have asked that resilience be included in the supply chain structure (Sheffi, 2005; Waters, 2007). Waters (2007) identified that this (design of a resilient supply chain) is generally achieved by "normal practice" of good logistic management but that present trends in supply chain management have eroded it. One particular trend widely accepted and adopted is "Lean". The heart of lean is the Just-in-Time operations. Originally observed in the Toyota Production system, JIT reduces waste by making sure that activities are done at the right time, with minimum waste and maximum quality (Womack et al., 2007). Suppliers come in at the time needed, not earlier or later.

Kleindorfer and Saad (2005) developed a conceptual framework called SAM (S-Specify source, A-Assess, M-Mitigate). The outcome of Kleindorfer and Saad (2005) work produced a Disruption Risk Management (DRM) framework which consisted of ten key principles. However, they noted that their suggestions were difficult to implement and suggested further research. Most real world practices follow two approaches: excessive redundancy or flexibility (Sheffi and Rice, 2005). Redundancy involves the use of inventory, safety stocks or multiple sourcing to manage disruptions (Tomlin, 2006; Keindorfer and Saad, 2005). They recommended flexibility, stating that it would help to build resilience and could even lead to improvement. The flexibility was not to replace the entire lean strategy but to co-exist with it. Many authors have written extensively on the strategic

importance of the selection process to any supply chain (Choi and Hartley, 1996; Karpak et al., 2001; Giunipero et al., 2006; Cousins et al., 2008; Wu, 2009). According to their work, it practically determines the competitive edge and success story for organisations in various sectors. This ranges from the aerospace, to automobile, Information technology, even to the agricultural sector.

Initially, supplier selection was done haphazardly with little structure in decision making. Also, organisations accessed most of the material needs from numerous sources and price was the main criteria (Cousins et al., 2008). However, the emergence of the several systematic models changed this. This list of criteria is increasingly complex, and several tend to conflict with each other. In order to deal with these complexities, several models have been proffered. Lee et al. (2001), based on a literature review, observed two main categories. These are mathematical programing (MOP, LP, MIP) and weighting models (AHP, ANP, and Linear scoring model). De Boer et al. (2001) reviewed and summarized the decision making techniques discussed in literature, from as far back as Weber et al. (1991) down to 2001. Their work covered all the stages in the selection process framework developed by De Boer et al. (2001). Because most Supply Chain managers try to consider both the qualitative and quantitative factors, there has been a preference for multi-criteria decision (MCD) methods. Lee et al. (2001) advocated for combinations of different methods, and at different stages in order to select suppliers. In general, Literature on supplier selection (De Boer et al., 2001; Choi and Hartley, 1996; Weber et al., 1991; Ha and Krishnan, 2008) concludes that the selection process may involve different types of criteria, combination of different decision models, group decision-making and various forms of uncertainty. With all the various techniques and models developed, there is a general consensus that no single method is best, as they all have their advantages and disadvantages in specific scenarios and particular sectors. Ulusoy (2003), observing trends in Turkey's manufacturing industries, recommended multiple-sourcing for the vital parts and making the system as "lean" as possible. An extraordinarily detailed extension work by Meena et al. (2011) proposed an algorithm which selects optimum number of suppliers for components. The basis for their calculation was the quantitative effect any disruption, from any part of the Supply Chain, would have on the overall business. Although getting an optimal number is ideal, it makes several assumptions. It considers all disruption probability as equal and the only relevant criteria used was the "importance of the component" supplied. This can be difficult to assess. Also, it assumes that as soon as a supplier is affected by disruption, there is no remedy for the situation and the business relationship closes. It does not also determine what factors are to be used in selecting these selected numbers. Combined with the geographical distributed

Table 1. Methods available for carrying out research.

Method	Form of research question	Control of events?	Focus on contemporary events?
Experiments	How, why	Yes	Yes
Surveys	Who, what, where, how much, how many	No	Yes
Archival analysis	Who, what, where, how much, how many	No	Yes/No
History	How, why	No	No
Case study	How, why	No	Yes

Source: Yin (2009).

suppliers today, the ability to manage several partners effectively diminishes.

Guido et al. (2009) suggested using the TCA for the selection process and giving suppliers specific guidelines on actions to take during disruptions. Although financially acceptable, disruption management and knowledge transfer is unidirectional. This kills opportunity for input from one end. Sawik (2011) formulated a mixed integral program that used a Value-at-Risk and conditional Value –at-Risk approach to select a supplier. This model is very effective in selecting the least risk-prone supplier, but tends to prioritize risk. Making this the decisive factor is in error because it will be difficult to determine if and when the high "priority" disruption will occur. Hence, the advantage of high quality and low cost may be lost on events that may never occur. Also, the model is complex and requires a lot of variables and computing power to properly use.

RESEARCH DESIGN AND METHODOLOGY

The Interpretivism paradigm approach was used for this research. This choice implies the use of reason and arguments in seeking truth and knowledge. The intention is to use case studies to develop a platform for dealing with the research question. Tidd and Bessant (2018) and Bessant et al. (2005) suggested "observing trends" which can complement and sit-together with "steady-state" innovations when dealing with "unsteady-states". This formed the basis for the choice. The primary study used is the recent Tsunami in Japan. The available information online makes it particularly suitable.

The research also considers the Philips factory fire incidence at their factory in Albuquerque. This will help make the analysis more robust and add information in areas where there are gaps. Several interview sessions were conducted to help gain useful and insightful opinions from experts in this field. This includes both business executives who understand organizational activities and professionals from the academia. As this is an applied science which has real world application, their experience was crucial in developing answers which add value to the results of this research. The rationale for choosing this methodology has been justified. It also defines some key terms associated with this method and identifies works which have used it successfully.

Interpretivism paradigm, case study approach

The interpretivism paradigm is particularly suited because it

"involves an inductive process with a view to providing interpretive understanding of social phenomena within a particular context" (Collis and Hussey, 2009: 57). Our application of intrepretivism permits us to utilize a small sample of "event" over a period of time. In this research, the case-study resonates about the effect of the tsunami on Supply Chains in Japan over five months (March- July, 2011). According to Yin (2009), the exact methodology depends on (Table 1):

(i) The type of research question poised
(ii) The level of control by the investigator on the events
(iii) The degree of focus on contemporary rather that historic events.

Limitation in research design

Like all research methods, the case study approach has limitations. This includes inherent limitation in the method itself, and limitation as a result of research activities. As a method, the case study approach has limited capacity to address issue of reliability. This is because case studies express and highlight particular information which, in the researcher's view, is relevant. In other words, case studies can lack rigor and suffer from biased views and partial evidence. However, the benefit of using this approach is high. Observing activities in their natural environments ensures that this paper identifies the major criteria needed to answer the research question and proffer adequate recommendations. The solution is expected to be applicable in real world, not theoretical; hence, the restrictions in choice of methodology approach. The inherent limitations can be controlled by using multiple information sources and methods to investigate the research question.

Case-study: The Japanese Tsunami

On the 1st of March, 2011, an earthquake struck the North-east coast of Japan at 1446 local time (0546 GMT). It released a tremor of 8.9-magnitude and was described as the most powerful earthquake ever observed within the region (The Guardian, 2011, BBC 2011a). This tremor resulted in a Tsunami that swept through 35% of the country's landmass. It caused major destructions and disruptions of activities within those regions. Asides the destruction to properties and loss of life, the other major damage was to their power system. The Tsunami affected the cooling system of the Fukushima nuclear reactor and it has heating challenges. This resulted in an explosion and nuclear radiation was released into the atmosphere (BBC, 2011a) (Figure 1).

Effect on the semiconductor industry

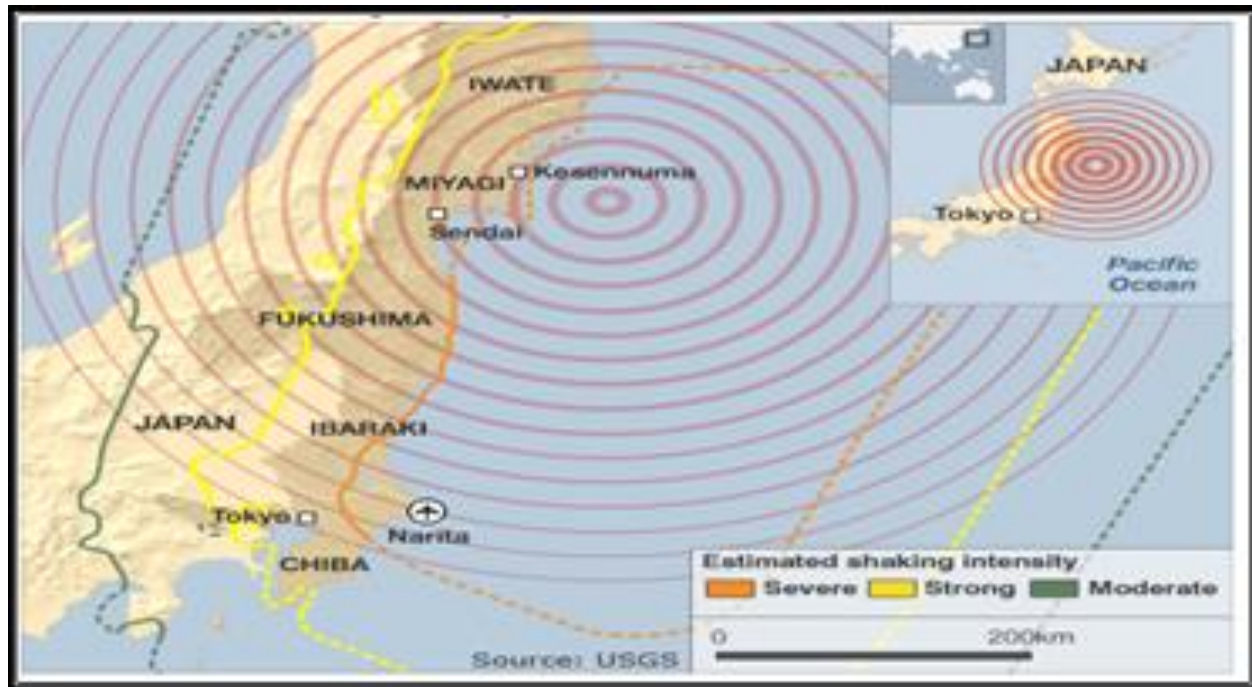In IHS iSuppli's analysis, it is observed that Japan was responsible

Figure 1. Areas affected by the Earthquake and Tsunami.
Source: BBC (2011a).

for close to 13.9% of revenue generated from electronic equipment globally, in 2010. This is valued at $216.6 billion compared to $1.6 trillion worldwide (WSJ, 2008; Electronic Products, 2011). For microchips production alone, they were responsible for global semiconductor production valued at $63.3 billion, representing 20.8% of the worldwide market (Electronic Products, 2011). One plant belonging to Shin-Etsu produces a fifth of the world's 300-millimeter (12-inch) silicon wafers (Nystedt, 2011). Some other specific products include the NAND flash conductor (40%), DRAM (15%), MEMS (32.5%), which are heavily used in consumer electronics (Supply Chain Digital, 2011; Bouchaud, 2011; DigiKey, 2011).

Impact to the sector supply chain

While describing the impact, Dale Ford, senior vice president for semiconductor market intelligence (SEMI) at IHS said:

"In the history of the electronics Supply Chain, nothing has had such a broad impact as the Japan earthquake, tsunami and nuclear disaster.
…with the impact of the disaster reverberating through the materials, components and equipment segments of the Supply Chain." (WSJ, 2008; Electronic Products, 2011)

Reports revealed that several facilities reported to be in good condition had to shut down as a result of the disruption to their Supply Chain. Suppliers were having challenges getting raw materials produced and distributed (Electronic Products, 2011). The effect was global because companies in other countries and sectors, which depend heavily on Japan supplies, were also affected (Frommer, 2011). None could state when production would resume. Within the sector, there was a downward review of all business forecast. Andrew Lu, an analyst with Barclay Capital (Asia) noted that the shortage of materials would affect the ability to

meet demand. He cited Mitsubishi Gas Company (MGC) as an example. According to him, the expected "3-month" shortage of resin shipment from MGC was expected to put at risk up to half of global output of chips used in Smartphone and tablet computers. This is because they (MGC) controlled 90% of the market and had shut down production (Yasu, 2011). One popular speculation then was that the effect would affect the launch of the highly-publicized iPad- 2 launch (Frommer, 2011).

Effect on the automobile industry

Japan plays a major role within the automobile industry. They were the third largest exporter of global light vehicle in 2010, next to Europe and after China. Together with Korea, they produced 18.2% of the 71,901,200 vehicles made (Reuter, 2011). Studies show that pre-Tsunami Japan had a daily estimated production of 37, 217 vehicles per day. Toyota Motor Corp accounted for 44% of total output, followed by Nissan Motor Co Ltd at about 12 per cent (Reuter, 2011). However, this does not even give the true picture of the sector's importance. According to Dave Andrea, most manufacturers who thought they had no links to the Japan, suddenly found that "several parts, within part, within part" were single-sourced from Japan (Reed and Simon, 2011).

Impact on supply chain

The implication to the sector was global. There were shortages of parts, at virtually every level of the supply chain. Toyota's spokeswoman, Shiori Hashimoto, said the company was struggling to secure around "150" different auto parts (Fast Motoring, 2011). In order to continue production based on available parts, they had to reduce their global production by as much as 50%. Ironically, even internal supply chains were affected. A typical example is the engine supply issues experienced by Nissan. Reports by Nomura
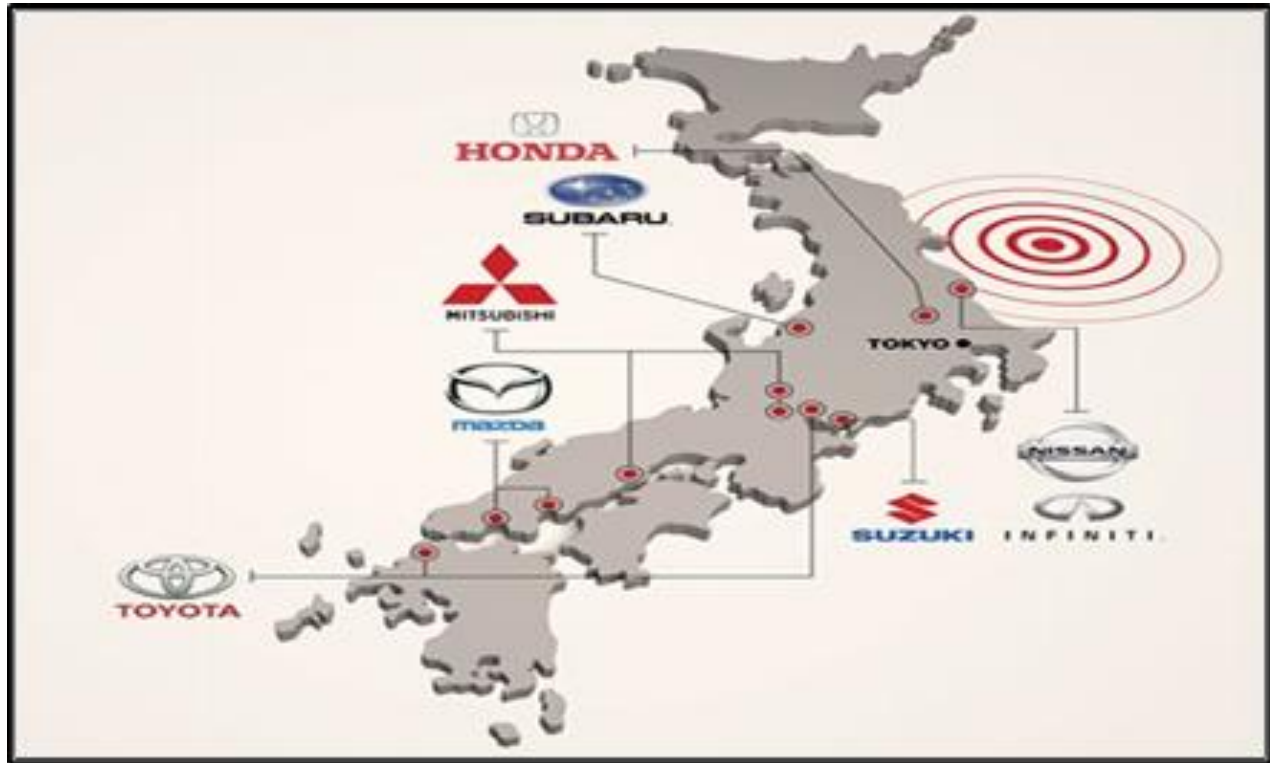
Figure 2. Earthquake centre and geopgraphical distribution of major production facilities of automobile companies.
Source: Fast Motoring (2011a).

show that Nissan's Iwaka factory is responsible for more than 12% of their engine manufacture. Unfortunately, it was in the region affected by the Tsunami (Fast Motoring, 2011). The production of some models had to be stopped and the effect was felt by consumers. Figure 2 gives a map view automobile-manufacturer plants close to the region affected by the Tsunami.

Even components which would have been considered "non-critical" also created challenges. For example, most organisations reported shortage to some paint supplies. Xirallic in particular was in very short supply. A special pigment which gives cars their glistening and shimmering appearance was developed and patented in Japan by a German chemical company, Merck KGaA, The only facility producing the pigment is located in Onahama town. This facility was seriously damaged by the tsunami and also exposed to radiation. Because of availability issues, several automobile orders requiring this paint were unavailable to customers, worldwide (Boudette and Bennett, 2011). These examples highlight the challenges just after the Tsunami. In summary, the disruptions to Supply Chains affected major car manufacturing corporations, globally. Toyota, the world's largest manufacturer, had already lost the equivalent of 260,000 vehicles due to a 20-day suspension at most of its domestic factories (Fast Motoring, 2011) yet it warned that its 14 factory plants in North America and Europe also face the same problem with production (The Guardian, 2011). Nissan reported that between 15 and 20% of its components are shipped in from Japan, and hence, their ability to deliver was severely affected. Many of the world's auto makers, including Ford Motor Co., Chrysler Group LLC, Volkswagen AG, BMW AG, Toyota Motor Corp. and General Motors Co., also reported disruptions and delays to their supplies (Boudette and Bennett, 2011). Malcolm Penn, chief executive of research firm Future Horizons gave a summarily assessment of the impact when

he said the economic and financial effect would "hit hard" within three months when the demands for the quarters could not be met (BBC, 2011b).

Semiconductor sector

In a turn of events, Arthur (2011) released a reviewed forecast suggesting that worldwide purchasing of IT hardware, software, and services would grow by 7.1% in 2011. This is actually an improved forecast. The pre-tsunami forecast was 5.6% and this was revised downward in the wake of the Tsunami incidence. IHS gave a higher post-tsunami forecast, suggesting that the global semiconductor revenue growth would experience a sequential rise of 7.4% within their 3rd quarter trading (IHS Pressroom, 2011). This new forecast has worldwide IT spending growing from $3.42 trillion in 2010 to $3.67 trillion in 2011.The computing and hardware segment is poised for the strongest growth, with spending forecast expected to grow by 11.7 and $419 billion (SEMI, 2011a). Myer Stanley, president and CEO of SEMI, gave the perfect summary to the sectors' post tsunami activities:

"Semiconductor equipment manufacturers will still see a double-digit increase in spending for 2011 following a "phenomenal recovery year" with triple-digit growth in 2010" (McGrath, 2011).

Automobile sector

However, the story is not exactly the same with the automobile industry. Although very little information is available on suppliers, the major automobile manufacturers still reported challenges.

Toyota reported that "30 parts types that had been unavailable are now in ready supply" (Just Auto, 2011a). Ironically, this does not necessary mean that all supply issues have been resolved. The other big two, Honda and Nissan did not have much better news, with Honda having to cut their China production forecast by 13% (Just Auto, 2011b).

Also, the major challenge many organizations faced with most suppliers, power supply, remained unresolved (The Guardian, 2011). This is unlike the semiconductor industry, which secured an agreement with government exempting them from power sharing cuts. Toyota's Chief Operating Officer, Toshiyuki Shiga, had suggested a shift in operating schedule to prevent the electricity system from failing during peak periods. This was to meet Government demand of energy savings in order to relieve the strain on the already burdened power system. However, even this agreement developed loopholes as stakeholders stated their plans to boycott the agreement (The Guardian, 2011). The possibility of further breakdown in power infrastructure was high.

According to U.S.A Federal Reserve Chairman Ben Bernanke, Japanese Supply Chain disruption was having widespread effect on other sectors and listed it as one of the "transitory" factors holding back the U.S. recovery (The Guardian, 2011). However, it has not been all bad news. Toyota, at the beginning of July, recognized the challenges they face but reported that operation would be restored in October. This was one month ahead of the initial estimate (Just-Auto, 2011). Also, most of the reported challenges have been resolved. The Xirallic paint facility earlier reported as damaged was being restored and efforts are being geared to build a backup facility.

RESULTS AND DISCUSSION

During the research, five major factors are observed to be crucial, in the rapid restoration of supply chains. These have strategic implications and are listed below:

The importance of communication and information integration

Being able to communicate, either via operations integration with the supplier or advanced reporting tools is essential to the responsiveness of any supply chain. Communication in this case refers to established 2-way access to production data and information. This could be direct or indirect. It is direct when the information is passed across using advanced reporting tool and each party monitors this information separately. Indirect communication implies that the supplier delivers incidence reports at regular interval. This is based on supplier integrity and trust. This feature is significant because the ability to communicate the occurrence plays a key role in understanding the situation and reacting properly. Even when the entire incidence is not understood, it helps to control the situation and build cooperation.

Using statements from Keenan Evans, ON Semiconductor's senior vice president of Quality, Reliability and EHS, the research observed the benefit of appropriate information dissemination among all parties involved:

"Within the first hour, all global operations were notified of

the events through established messaging and Share Point alert.
…many of the demands would be impossible to meet even under less-pressing time constraints, but diligent communications and customer service were able to restore customer confidence and order schedules"(SEMI, 2011b).

Across board, supplier-associations within the semiconductor industry set up online links with updated repairs and this was available to the public (Mouser, 2011). This extensive list helped in preventing market panic and building a platform for affirmative action. However, this research did not observe the same collaborative reporting amongst automobile suppliers. There were insufficient details on the actual status of 1st and 2nd tier suppliers from within the automobile sector. While it may have been as a result of negligence during this research's data collation exercise, an interview with a substantive stakeholder also observed this shortcoming. In an interview granted by a trade union official with Honda (Swindon), he said:

"There was no quality information getting back. Car parts were being shipped only part-way and communications were at a halt" (The Guardian, 2011).

Retrospectively, even when suppliers do not communicate information quickly, being able to identify the disruption promptly is essential. This may mean having integrated systems with suppliers. The Philip Fire incidence highlights the importance of integration:

Nokia reported having a system which relayed the production output from their suppliers' factories. When the fire broke out at Albuquerque, they perceived the disruption even before Phillip informed them. Hence, they had already initiated their crisis management plan. Nokia used this advantage to identify and secure excess capacity at other suppliers' sites. Ericsson did not notice any glitches to their supplies until they got informed four days after. This affected their ability to respond, and they were unable to secure alternate facilities (Latour, 2001). Most authors argue that strong buyer-seller interaction leads to successful business relationships. Lean innovation (JIT) observes that it is an essential element in building efficiency in the system (Lamming, 1996). Also, Lee et al. (2001) maintain that amongst available alternatives, manufacturers select the supplier that is able to maintain successful relationships. Hence, establishing communication links becomes an issue after agreeing to business partnership. Reason could be:

(i) Client base size and portfolios
(ii) Propriety or closed communication system
(iii) The Organisational culture (in terms of communication).

There is a need to have a disruption management

framework. Although it can have different names (e.g. Crisis Management Plan, Disaster Recovery System), the framework is essentially the same and goes beyond the traditional risk management plans or registers. It does not target any specific event but rather lists a comprehensive set of processes and procedures. These effectively reduce or repair disruptions to supplies to/from customers/suppliers. While most organizations claim to have this in place, those whose systems have proved satisfactory, admit that it only became effective after previous failed attempts. Yu and Qi (2004) noted that the DMP involves dynamically revising the original plan to take into consideration "constraints and objectives of the evolved environment" (2004: 18). One interview participant broke down the activities for dealing with disruptions into three:

(i) Disruption Prevention: Activities aimed at preventing the incidence before it occurs.
(ii) Disruption Mitigation: Activities aimed at reducing the adverse effect when it occurs.
(iii) Disruption restoration: Activities which are aimed at restoring the broken down system. It may require a restructuring of the entire supply network.

He observed that while most organizations develop frameworks to prevent (eliminate risk-factors) disruptions from occurring (e.g. via Kaizen, geo-sourcing), remarkably few have the means to manage their occurrences. This raises a difficult question. Admittedly, "prevention is better than cure and mitigation better than recovery". Many authors in operational risk accept that it is best to address risk, proactively (Tang and Nurmaya, 2010; Waters, 2007; Kleindorfer and Saad, 2005). According to a second interviewee, usually organizations create risk registers. It lists processes and procedure to deal with challenges as they arise. However, he admits that these systems maintained for the sole purpose of proper documentation of actions in insurance claims, rather than restoring supplies in the short term is grossly inadequate. Disruption management processes and strategy need to be created and maintained. In conclusion, this research argues that there is a need to separate the risk profile of suppliers into two:

(i) Risk Prevention, based on risk registers and lean operations to improve operational efficiency.
(ii) Disruption Mitigation and Restoration (DMandR), based on disruption management plan.

From all reports of the tsunami incidence, power was the greatest challenge in restoring production (BBC, 2010b). However, while the automobile industry and their suppliers made attempts at managing what was available, the Japanese Ministry of Economy, Trade and Industry gave the semiconductor industry concession by excluding them from the energy rationing plan (SEMI, 2011b). This concession gave them considerable advantage over other sectors. With guaranteed supply, there was a higher probability of returning to pre-tsunami production quickly. Careful research has shown the presence, impact and effectiveness of government in some of the most "open-economies" e.g. Singapore (Lim, 1983). Some argue that it becomes prominent in unsteady state or during failures (Medema, 2009; Laffont, 2008). Although this intervention has diverse macro-economic implications, it plays a significant role in restoring the Supply chain after "geographical disruption in collocated sectors" within their jurisdiction. It would be inappropriate not to consider this during the selection stage.

Cooperation and alliances amongst organisations

The ability of suppliers to cooperate amongst themselves via alliances plays a crucial role in producing a positive response to disruptions. Alliance would mean competing organizations coming together to cooperate and collaborate in order to achieve preset objectives. Slowinski and Sagal (2003) state that it refers to business relationships which retains agreed degrees of flexibility. This enables them to handle their independent operation, while fulfilling their joint commitments. In general, this essential component plays duo roles: (1) strategic collaboration for innovation and development in the sector and (2) supportive framework for disruption management. Interactions ensure that there is an improvement in the system because of access to resources. This is useful when dealing with disruption. Water (2007) observed that when companies work in isolation, the potential for risk to cause damages is higher than when there is collaboration. This involves both members of the supply chain, vertically and horizontally.

Other observations: Implication for procurement managers

The research exposed some issues which that suggest that purchasers also have a role to play in disruption management. This report will list them out. It will also discuss their implications in the selection process.

Proprietary technology

One problem identified during this research is the issue of propriety technology and customized parts. Customized parts indicate that the component is specific to organization (purchaser). Propriety refers to instances where individual companies (supplier) control the technology to produce a specific component. Because of these restrictions, restoring production during disruptions tends to be difficult. This increases if the component is produced at a single factory location. Typical examples are the RT resins and Xirralic paint used in smart phones

and tablet PC. Both were proprietary, and in the case of Xirralic, production was limited to a single facility (Schmitt, 2011).

Internally, this raises some questions that require beaming the searchlights on the purchaser. For example, it will be pivotal to determine if the components supplied are common or customized. Customized or proprietary parts increase the risk profile for that supply. This same issue is raised by Sheffi (2005) and Tang and Nurmaya (2010). They suggested the use of interchangeable parts. Already firms like Renault and Nissan are considering it. In a recent report, their Group C.E.O, Carlos Ghosn announced that the use of common adoptable parts may be a key consideration in future designs (Just-Auto, 2011). Japan Automobile Manufacturers Association (JAMA) president, Toshiyuki Shiga, also stated that they would look into the issue of generic parts that allow easy switching between different supplier facilities (Warburton, 2011).

Contractual agreements

One of the interview sessions revealed that some companies promote exposure by placing production restrictions on suppliers. These may be contractual conditions as regards location of production facilities and could even extend to waste disposal clauses. This is especially true for products where there is a potential for IP theft or Black market rip-off. This is interesting because, in this case, the supplier's risk profile increases due to purchasers demand. Internal attempt at providing slacks to accommodate these challenges need to be examined and created. However, for this to occur, proof of alternate facility with spare capacity is necessary. In the Semiconductor and Auto industry, information clearly alludes to the benefits of this:

Texas instrument (TI): "*In the first few days after the earthquake, TI had identified alternate manufacturing sites for about 60% of Miho's work-in-process, and has since increased that to more than 80 %*" (PRNewswire, 2011).

Mark Adams, Vice President purchasing manufacturing group, Toyota, praising some suppliers: "*Where [restoring factories] was not possible, alternative sourcing was (cut) arranged by first-tier suppliers, normally from the same company but another facility. "That is one of the functions they provide to us*" (Graeme, 2011). Generally, most advocates of lean production criticize the idea of having excess capacity (Lamming, 1996). However, risk specialists have made clarification to this.

Summary analysis and reflection

There are two fundamental approaches to managing

disruptions. This includes:

(i) Strategies and actions aimed at minimising the frequency and severity of risks faced, at both the firm level and across the supply chain.
(ii) Increasing the capacity of supply chain participants to sustain/absorb more risk, without significant negative impacts, or substantial operational disruptions (Kleindorfer and Saad, 2005).

This research is most relevant to the second approach. It considers the selection process as a strategic point to ensure that the supply chain has the capacity to respond to disruption and tried to find key elements that promote resilience. This research provides the following observations:

(i) Information Integration is key to effective communication. This, in turn, is a prime factor for supply chain resilience to disruption
(ii) Evidence of disruption management expertise provides a clear pointer to the responsiveness of a supplier.
(iii) Collaborative and alliances agreement is strategic to seamless switching between supplier facilities, in the wake of a disruption.
(iv) Government preference dictates the pace of recovery when the disruption affects multiple sectors of suppliers within a same geographic region

These observations raise a lot of questions which need to be considered during the selection process.

Reflection

The above report has wider implications. It observed the rapid increase in disruptions and its effect on supply chain. It also highlights the need for innovative action to deal with it. This need calls for a different approach to doing things. Tushman and Nafler (1986) noted that effective innovation requires synthesis between needs, possibilities and capabilities. This work has identified needs and offered possibilities. It now requires supply chain managers to provide the capabilities (dedicating resources) to engage the framework suggested and harness its benefits. This report will end with suggestions of two paths organization can take to benefit from this report:

Engage in incremental process-innovation: This work provides an opportunity for process innovation. It recommends that supply chain managers include the identified criteria to the selection process. Innovation experts would consider it incremental because this recommendation would not radically alter the way professional supply chain experts perform selection. Nevertheless, the benefits from this cannot be

undermined. It means that the purchaser can maintain his previous method, while gradually building a disruption-resilient system.

Radical process-innovation: A more radical recommendation will be for supply chain managers to re-evaluate their entire supply chain in order to build resilience. This involves studying and understanding the entire supply structure for component procurement. It would provide an opportunity to review all suppliers (Present) and the benefit is the cost-effective assurance of response during disruptions. Also, it may provide opportunity for other types of innovation, like new product developments. Regardless of the innovative approach organization chosen, the outcome will yield positive results.

Research limitations

Quantitative input

There is an absence of quantitative input from multiple stakeholders. This would have helped identify several sublime elements which this general approach did not observe or consider.

Generalization

The outcome of this research provides broad recommendations, which are not specific to any particular sector.

Time frame

The timeframe for this research is relatively short. Although it is sufficient enough to observe organisations that produce swift response and clear criteria were identified, it does not consider some of the long-term effect of these suggested criteria.

Criterion significance

Although the report suggests that each criterion is relevant in selection process, there is no information or research data on the actual weight each should be given in the selection process.

Cultural influence

The main case study (Tsunami) is on a nation (Japan) that has peculiar philosophies and practice e.g. Keirestsu. There are arguments that the Japanese culture has an overbearing influence on the way businesses are operated in that region. This may have influenced the observations in this case study.

Sample implementation

There was no opportunity to implement the recommendation of this paper. This would have helped in locating/identifying more challenges with real-world implementation.

Conclusion

This paper follows from previous work on disruption management. It identifies the current challenges in dealing with disruptions. It took a critical look at the supplier selection considering a strategic point for building the resilience of an organization's supply chain in the wake of a disruption. The research challenge was to identify those "criteria" which are important to observe, during the selection process. The aim was to recognize and select suppliers who will produce positive responses to disruption. The researcher used multiple-case studies, backed by interviews and literature, to answer the question. It identified those critical factors which promote positive response to disruption, and recommended guidelines to confirm them, when selecting potential suppliers. Some key points from this paper include:

(i) The need to consider not only risk prevention, but risk mitigation and restoration plans in risk profile of suppliers.
(ii) It emphasizes the importance of proper monitoring of both hard and soft risk-factors in selection.

It outlines the strategic importance of:

(i) Communication integration
(ii) Tried and tested disruption plans
(iii) Cooperation agreements and alliances
(iv) And political will, in dealing with disruptions.
(v) It maintains that all this work together to produce the "responses" observed in the case studies.
(vi) It also recognises the need to look inward during before and during the selection stages. It recommends that the outcome should dictate future activities for supply chain managers.
(vii) It finally accepts that the issue of disruption management in the supply chain is an innovation challenge. It recommends doing this via the opportunities at the selection stages and suggests process-innovation steps which could either be incremental or radical.

Recommendations

This paper will conclude by making the following recommendations:

(i) Supply chain managers should embrace this innovative approach and engage the challenges of disruption management from the selection stage. It will ensure that resilience is built into the system.

(ii) There is an increase in calls for a "Risk intelligence database. Supply chain managers should consider this seriously. It will give them access to real time and make it easy to monitor the supply chain structure.

(iii) Also, suppliers should consider the findings in this report and build their operations around the recommendations. This will prove useful because it ensures they can guaranty production when disruptions occur.

For further research, there is a need to observe the strategic importance of each criterion observed to the resilience question. Some of the criteria observed change very quickly. Example includes political environment and legislative policies. Knowing the effect of these changes will ensure that supply chain manager can quickly take decisions that maintain resilience in the system. This will ensure that the "Risk intelligence data" remains useful.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

REFERENCES

Baum J (1999). Back on track. Far Eastern Economic Review. P 25.
BBC (2011a). Japan earthquake: Tsunami hits north-east. BBC News 11 March, 2011. Available at: https://www.bbc.com/news/world-asia-pacific-12709598
BBC (2011b). Japan disaster: Supply shortages 'in three months. Available at: https://www.bbc.com/news/business-12782566
Bessant J, Lamming R, Noke H, Phillips W (2005). Managing innovation beyond the steady state. Technovation 25(12):1366-1376.
Bouchaud J (2011). Global MEMS Industry Is Relatively Unaffected by Japan Quake Aftermath: Location of Japanese MEMS fabs—and alternative production sites-play important role in shielding industry. Available at: https://technology.informa.com/394328/global-mems-industry-is-relatively-unaffected-by-japan-quake-aftermath
Boudette NE, Bennett J (2011). Pigment shortage hits auto makers. The Wall Street Journal P 26.
Brindley C (2004). Risk focus towards customers. Supply Chain Risk 2004:66-78.
Byrne PM (2007). Impact and ubiquity: two reasons to proactively manage risk. Logistics Management 46(4):24-25.
Choi T, Hartley J (1996). An exploration of supplier selection practices across the supply chain. Journal of Operations Management 14:333-343.
Christopher M, Lee H (2004). Mitigating supply chain risk through improved confidence. International Journal of Physical Distribution and Logistics Management 34(5):388-396.
Collis J, Hussey R (2009). Business research: A practical guide for undergraduate and postgraduate students. 3rd ed, Basingstoke: Palgrave Macmillan, ISBN: 9781403992475.
Cooper MC, Ellram LM (1993). Characteristics of Supply Chain Management and the Implication for Purchasing and Logistics Strategy. The International Journal of Logistics Management 4(2):13-21.
Cousins P, Lamming R, Lawson B, Squire B (2008). Strategic Supply Management: Principles, Theories and Practice. Prentice Hall Financial Times 308 p.
Craighead CW, Blackhurst J, Rungtusanatham MJ, Handfield RB (2007). The severity of supply chain disruptions: design characteristics and mitigation capabilities. Decision Sciences 38(1):13-56.

Crothers C (1999). PC industry hit by Taiwan quake aftershocks. Available at: https://www.cnet.com/news/pc-industry-hit-by-taiwan-quake-aftershocks/
De Boer L, Labro E, Morlacchi P (2001). A review of methods supporting supplier selection. European Journal of Purchasing and Supply Management 7(75):89.
Deane JK, Craighead CW, Ragsdale CT (2009). Mitigating environmental and density risk in global sourcing. International Journal of Physical Distribution and Logistics Management 39(10):861-883.
DigiKey (2011). MEMS supply only slightly affected by Japanese quake: Much of MEMS production in Japan is in southern part of country. Available at: http://www.digikey.com/us/en/purchasingpro/articles/supply-chain/mems-supply-only-slightly-affected-by-japanese-quake.html?WT.z_pp_page_sec=SN
Electronic Products Dale, F. (2011). News Flash on Japanese Earthquake Impact from IHS iSuppli. Available at: https://www.electronicproducts.com/news-flash-on-japanese-earthquake-impact-from-ihs-isuppli/#
Fast Motoring (2011). Toyota maintain limited output in Japan from May 10 to June 3". Fast Motoring | April 18, 2011. Available at: http://www.fastmotoring.com/index.php/2011/04/toyota-maintain-limited-output-in-japan-from-may-to-june-3/
Fisher M (1997). What Is the Right Supply Chain for Your Product? A Simple Framework – Can You Figure Out The Answer?" Harvard Business Review 75(2):105-116.
Frommer D (2011). Apple supply chain temporarily affected by Japan earthquake, but demand stronger than ever. Available at: http://www.businessinsider.com/gene-munster-apple-supply-demand-2011-3
Arthur C (2011). Gartner slashes 2011 PC sales forecast again as consumers stay wary. Available at: https://www.theguardian.com/technology/2011/sep/08/gartner-pc-sales-forecast-slashed-2011
Giunipero L, Handfield RB, Eltantawy R (2006). Supply management's evolution: key skill sets for the supply manager of the future. International Journal of Production and Operations Management 26(7):822-844.
Graeme R (2011). France: Toyota suppliers shoulder sourcing solutions. Just Auto: Graeme Roberts | July 14, 2011. Available at: http://www.just-auto.com/news/toyota-suppliers-shoulder-sourcing-solutions_id112648.aspx
Guido JL, Cagno ME, Giulio AD (2009). Reducing the total cost of supply through risk-efficiency-based supplier selection in the EPC industry. Journal of Purchasing and Supply Management 5(3):166-177.
Ha SH, Krishnan R (2008). A hybrid approach to supplier selection for the maintenance of a competitive supply chain. Expert Systems with Applications 34(2008):1303-1311.
Hendricks KB, Singhal VR (2003). The effect of supply chain glitches on shareholder value. Journal of Operations Management 21(5):501-523.
Hendricks KB, Singhal VR (2005). An empirical analysis of the effect of supply chain disruptions on long-run stock price performance and equity risk of the firm. Production and Operations Management 14:53-68.
IHS Pressroom (2011). Electronics supply chain to fully recover from Japan disaster in Q3. IHS Pressroom | June 20, 2011. Available at: http://press.ihs.com/press-release/product-design-supply-chain/electronics-supply-chain-fully-recover-japan-disaster-q3
Just-Auto (2011). Japan: Toyota 'normalising' a month early. Available at: http://www.just-auto.com/news/toyota-normalising-a-month-early_id112489.aspx
Juttner U, Peck H, Christopher M (2003). Supply chain risk management: Outlining an agenda for future research. International Journal of Logistics: Research and Applications 6(4):197-210.
Karpak B, Kumcu E, Kasuganti RR (2001). Purchasing materials in the supply chain: managing a multi-objective task. European Journal of Purchasing and Supply Management 7:209-216.
Kilgore JM (2004). Why analytical risk mitigation is critical to supply chain design. Inventory Management Report 4(4):7-11.

Kleindorfer PR, Saad GH (2005). Managing disruption risks in supply chains. Production and Operations Management 14(1):53-68.

Laffont JJ (2008). Externalities. The New Palgrave Dictionary of Economics, 2nd Ed.

Lambert D (2008). An executive summary of supply chain management: Process, partnerships, performance. Jacksonville: The Hartley Press, Inc.

Lambert D, García-Dastugue S, Croxton K (2005). An evaluation of process-oriented supply chain management frameworks. Journal of Business Logistics 26(1):25-51.

Lamming R (1996). Squaring lean supply with supply chain management. International Journal of Operations and Production Management 16(2):183-196.

Langley Jr CJ, Holcomb MC (1992). Creating logistics customer value. Journal of Business Logistics 13(2):1-2.

Latour A (2001). Trial by Fire: a blaze in Albuquerque sets off major crisis for cellphone giants. The Wall Street Journal, January 29, 2001. P A1.

Lee HL, Padmanabhan V, Whang S (1997). Information distortion in a supply chain: The bullwhip effect. Management Science 43(4):546-558.

Lee EY, Ha S, Kim SK (2001). Supplier selection and management system considering relationships in supply chain management. IEEE Transactions on Engineering Management 48(3):307-318.

Lim LYC (1983). Singapore's success: The myth of the free market economy. Asian Survey 23(6):752-764.

Martha J, Subbakrishna S (2002). Targeting a just-in-case supply chain for the inevitable next disaster. Supply Chain Management Review 6(5):18-23.

McCarthy T, Golicic S (2002). Implementing Collaborative Forecasting to Improve Supply Chain Performance. International Journal of Physical Distribution and Logistics Management 32(6):431-454.

McGrath D (2011). SEMI forecast sees 12% tool sales growth. Available at: http://forum.dft.nl/posts/listByUser/31553.page

Medema SG (2009). The Hesitant Hand: Taming Self-Interest in the History of Economic Ideas. Princeton University Press. ISBN-10: 0691122962.

Meena PL, Sarmah SP, Sarkar A (2011). Supplier selection under the risk of supply disruptions. Proceedings of the 2011 International Conference on Industrial Engineering and Operations Management, Kuala Lumpur, Malaysia, January 22 – 24, 2011.

Mouser (2011). Japanese Earthquake Supplier Updates. Available at: http://uk.mouser.com/japanese_supplier_updates/?cm_sp=TopNavT abs-_-SUPPLIERS-_-Japanese%20Earthquake%20Supplier%20Updates-_-na)

Mukherjee AS (2008). The fire that changed an industry: a case study on thriving in a networked world. Financial Times 1(1):10-12.

Naslund D, Williamson S (2010). What is Management in Supply Chain Management? - A Critical Review of Definitions, Frameworks and Terminology. Journal of Management Policy and Practice 11(4):11-28.

Norrman A, Jansson U (2004). Ericsson's proactive supply chain risk management approach after a serious sub-supplier accident". International Journal of Physical Distribution and Logistics Management 34(5):434-456.

Nystedt D (2011). Wall Street Beat: Markets Recover from Japanese Temblor. Available at: http://www.cio.com/article/678743/Wall_Street_Beat_Markets_Recov er_From_Japanese_Temblor?page=2andtaxonomyId=3233

PRNewswire (2011). TI's Japan factories on track for full recovery. PRNewswire | March 29, 2011. Available at: http://www.prnewswire.com/news-releases/tis-japan-factories-on-track-for-full-recovery-118874649.html

Quinn F (2006). Risky business. Supply Chain Management Review 10(4):5.

Reed J, Simon B (2011). Car components hit by Japan aftershock. Financial Times |March 28. Available at: http://www.ft.com/cms/s/0/9ac4d7e2-595f-11e0-bc39-00144feab49a,s01=1.html#axzz1WbiqUDsU

Reuter (2011). Japan lost autos output to hit 338,000 Friday: HIS. Available at: http://www.reuters.com/article/2011/03/21/us-japan-quake-ihs-idUSTRE72K65220110321

Rice JB, Caniato F (2003). Building a resilient and secure supply chain". Supply Chain Management Review 7(5):22-30.

Sabath R, Fontanella J (2002). The Unfulfilled Promise of Supply chain Collaboration. Supply Chain Management Review 6(4):24-29.

Sawik T (2011). Selection of supply portfolio under disruption risks. Omega 30(2011):194-208.

Schmitt B (2011). Japanese Parts Paralysis: The shiny paint is leaving the building. Truth about cars | May 10, 2011. Available at: http://www.thetruthaboutcars.com/2011/05/japanese-parts-paralysis-the-shiny-paint-is-leaving-the-building/

SEMI (2011a). Japan Semiconductor Industry Responds Successfully to Earthquake/Tsunami Crisis: Semiconductor Industry Exempt from Power Restrictions. Available at: http://www.semi.org/node/37656?id=highlights

SEMI (2011b). Crisis planning and preparation speeding Japan semiconductor recovery. Available at: http://www.semi.org/node/37546?id=highlights

Sheffi Y (2005). The Resilient Enterprise: Overcoming Vulnerability for Competitive Advantage. The MIT Press, Cambridge, MA. ISBN-13: 978-0-262-19537-9

Sheffi Y, Rice JB (2005). A supply chain view of the resilient enterprise. MIT Sloan Management Review 47(1):41-48.

Slowinski G, Sagal AW (2003). The strongest link: forging a profitable and enduring corporate alliance. Amacom. ISBN-10: 0814407439.

Spekman RE, Davis EW (2004). Risky business: expanding the discussion on risk and the extended enterprise. International Journal of Physical Distribution and Logistics Management 34(5):414-433.

Stock J, Boyer S (2009). Developing a consensus definition of supply chain management: a qualitative study. International Journal of Physical Distribution and Logistics Management 39(8):690-711.

Supply Chain Digital (2011). Spotlight on Japan: Questions flood Japan's supply chain after huge earthquake and tsunami. Available at: https://www.eetimes.com/from-the-edge-of-commsdesign-a-weekend-reader-volume-4/

Tang CS (2006). Perspectives in supply chain risk management". International Journal of Production Economics 103:451-488.

Tang O, Nurmaya MS (2010). Identifying risk issues and research advancements in supply chain risk management. International journal of Production Economics 133(1):25-34.

Telgen J (1994). Insight and overview: the challenges of Purchasing Management and Decision Making. Academic address at the University of Twente, Enschede, The Netherlands.

The Guardian (2011). Powerful earthquakes hit Japan. The Guardian March 11, 2011. Available at: http://www.guardian.co.uk/world/2011/mar/11/japan-earthquake-miyagi-tsunami-warning

Tidd J, Bessant JR (2018). Managing innovation: integrating technological, market and organizational change. John Wiley & Sons.

Tomlin B (2006). On the Value of Mitigation and Contingency Strategies for Managing Supply Chain Disruption Risks. Management Science 52(5):639-657.

Tushman ML, Nadler DA (1986). Organizing for innovation. California Management Review 3(Spring):74-92.

Ulusoy G (2003). An assessment of supply chain and innovation management practices in the manufacturing industries in Turkey. International Journal of Production Economics 86:251-700.

Veverka M (1999). A dram shame. Barron's.

Wagner SM, Bode C (2006). An empirical investigation into supply chain vulnerability. Journal of Purchasing and Supply Management 12:301-312.

Warburton (2011). Japan: JAMA mulls common parts move post-earthquake. Available at: http://www.just-auto.com/news/jama-mulls-common-parts-move-post-earthquake_id112115.aspx

Waters D (2007). Supply Chain Risk Management – Vulnerability and Resilience in Logistics. Kogan Page. ISBN- ISBN-10: 0749448547

Weber CA, Current JR, Benton WC (1991). Vendor selection criteria and methods. European Journal of Operational Research 50:2-18.

Womack JP, James P, Jones DT, Roos D (2007). The Machine That Changed the World: The Story of Lean Production-- Toyota's Secret Weapon in the Global Car Wars That Is Now Revolutionizing World Industry. Simon and Schuster, 2007, ISBN: 0743299795, 9780743299794

WSJ (2008). Big three seek $34 billion aid. Available at: http://online.wsj.com/article/SB122823078705672467.html?mod=todays_us_page_one

Wu LC (2009). Supplier selection under uncertainty: a switching options perspective. Industrial Management and Data Systems 109(2):191-205.

Yasu M (2011). Japan's quake may hurt battery, chip-wafer, LCD-Panel Markets. Available at: http://www.bloomberg.com/news/2011-03-16/japan-s-quake-may-hurt-battery-semiconductor-wafer-lcd-panel-markets.html

Yin RK (2009). Case study research: design and methods". 4th ed. Publication info: Los Angeles, Calif.; SAGE, ISBN: 9781412960991.

Yu G, Qi X (2004). Disruption Management: Framework, Models and Applications. World Scientific Publishing Co. ISBN:978-981-256-017-9

African Journal of Business Management

Full Length Research Paper

The impact of financial difficulties on earnings management strategies: The case of Italian non-listed firms

Gaetano Matonti[1]*, Aurelio Tommasetti[1], Carlo Torre[1] and Jon Tucker[2]

[1]Dipartimento di Scienze Aziendali - Management and Innovation Systems, University of Salerno, 132, Giovanni Paolo II Street, 84084 Fisciano (SA), Italy.
[2]Faculty of Business and Law, University of the West of England, United Kingdom.

This study investigates the impact of the degree of financial distress on the earnings management activities of Italian non-listed firms using a linear regression model proxied by the Altman Z-Score which controls the heteroscedasticity and autocorrelation using the Petersen method. The extant literature provides mixed evidence on this relationship for listed firms. In this study we find a positive (negative) relationship between financial distress risk and income-decreasing (income-increasing) earnings management, suggesting that firms tend to manage earnings downward as financial distress risk increases. In two robustness tests, we test the power of the Kothari model and we also analyse a reduced firm sample representing over 80% of the population, though the results are qualitatively the same. Our research has several implications for academics, practitioners, lenders, and national standard setters, showing that, in contrast to the extant literature, non-listed firms are more likely to manage earnings downward as their financial situation deteriorates. Furthermore, our findings are of interest to national standard setters and professional accountants who are concerned with advanced warning indicators of firm financial problems such as Altman's Z-score, especially in recent years in which countries are focused on developing robust empirical models to detect firm financial difficulties.

Key words: Financial distress, Altman's Z-score, accrual-based earnings management, non-listed firms, Italian context.

INTRODUCTION

Financial information plays an important role in mitigating agency problems between firm owners and lenders and other creditors who are concerned with the real financial performance of firms that they currently or potentially provide with finance. Where financial performance deteriorates, firms run the risk of having to repay lenders and creditors early, thereby reducing their borrowing capacity (Mafrolla and D'Amico, 2017). As a consequence, when firms experience financial difficulties, this may create an incentive for firms to mask poor financial performance by managing earnings upward. Dechow et al. (2010) finds that firms experiencing

*Corresponding author. E-mail: gmatonti@unisa.it. Tel: +39 3407438751.

financial distress are more likely to manage earnings upward, while DeAngelo et al. (1994) find that firms close to failure as the last stage of financial distress (Nagar and Sen, 2016) are likely to be more conservative than non-stressed firms. Therefore, managers of listed firms may adjust their earnings management strategy according to their proximity to technical default.

When listed firms run a lower risk of financial distress, managers are more likely to manage earnings opportunistically (upward) in order to mask weak financial performances. However, for firms close to bankruptcy as the final stage of financial distress (Habib et al., 2013; Nagar and Sen, 2016), their managers become more conservative and less opportunistic in the preparation of financial information (DeAngelo et al., 1994).

These findings indicate that financial distress impacts on the earnings management strategies of listed firms because it enables them to meet or beat analysts' forecasts. Opler and Titman (1994) find that US listed firms take actions that impact positively yet temporarily on operating income in the years approaching financial distress.

Mafrolla and D'Amico (2017), analysing a sample of Italian, French and Spanish non-listed firms, provide empirical evidence that the Basel II regulations, enacted from 2008, increase borrowers' incentives to engage in (income-increasing) earnings management to improve their creditwothiness and their borrowing capacities, since the financial statements of borrowers are deeply scrutinised by lenders in order to assess their ability to repay loans.

However, there is a paucity of literature concerning the relationship between financial distress risk and earnings management behaviour in non-listed firms.

In the extant literature, to our best knowledge, only Campa (2019) investigates earnings management initiatives in both listed and non-listed firms experiencing financial difficulties, and finds that French firms of both type are likely to manage earnings downward as financial difficulties worsen. Unfortunately, the findings of Campa's research do not provide evidence on the impact of financial distress on the earnings management incentives of non-listed firms as they only compare the earnings management strategies of listed and non-listed firms experimenting financial difficulties.

Therefore, since Italian firms are financed mainly by bank loans, the aim of this research is to investigate if a deterioration in the financial situation of Italian non-listed firms impacts on their earnings management initiatives. More specifically, we investigate whether managers of distressed firms are likely to engage in income-decreasing earnings management, according to the Jensen (1986) control hyptothesis, or in income-increasing earnings management initiatives, consistent with the debt hypothesis (Watts and Zimmerman, 1986).

Our research is grounded firmly in the extant literature and contributes to that literature by examining the link

between financial distress risk and earnings management which is underdeveloped in the context of non-listed firms. Our paper focuses on non-listed firms as they constitute the vast majority of firms in the European Union (EU, 2019), and around 99.8% of firms in Italy. The focus is on firms experiencing financial problems, rather than firms facing bankruptcy, as financial distress does not necessarily lead to bankruptcy (Habib et al., 2013). The context is interesting as Italian non-listed firms predominantly employ debt rather than equity to finance their operations (Poli, 2013a; Poli, 2015), and therefore such firms could have incentives to mask poor financial performance otherwise their access to credit may be impaired. Our research should provide some context for both academics and practitioners when analysing the reliability of financial information in Italian non-listed firms suffering from financial distress risk. To assess financial distress risk, we employ Altman's Z-Score, the validity of which is confirmed by Altman et al. (2017), and this established approach is employed extensively in the empirical literature (Habib et al., 2013; Nagar and Sen, 2016; Campa, 2019). Our findings suggest that increasing financial distress risk leads to greater income-decreasing earnings management, indicating that firms in technical default are more likely than healthy firms to managing their earnings downward.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Financial difficulties and earnings management

According to agency theory (Jensen and Meckling, 1976), managers of financially distressed firms may engage in earnings management initiatives to mask poor financial performance, threatening the interests of the firm's creditors and lenders (Panda and Leepsa, 2017). The extant literature (DeFond and Jimbalvo, 1994; DeAngelo et al., 1994; Beneish and Vargus, 2002) suggest that financial distress risk may impact on earnings management behaviour, thereby impacting the manager's accounting choices and the quality of financial information.

The extant literature investigates whether the degree of financial distress impacts on earnings management initiatives and employs a variety of proxies for financial distress. Some authors investigate this relationship in the case of those firms violating debt covenants as they are likely to be in financial distress (Gilson, 1989). DeFond and Jimbalvo (1994) find that US listed firms manage their earnings upward in the year before a costly debt covenant violation. Further, Sweeney (1994) finds that US listed firms violating debt covenants are more likely to engage in earnings overestimation to improve short-term cash flows and firm performance in order to avoid technical default. Dichev and Skinner (2002) argue that the direction of the earnings manipulation

(underestimation or overestimation) depends on the severity of the financial difficulties. In a sample of US listed firms, they find that a large proportion just meet the covenant threshold, indicating that these firms manage earnings to avoid the expensive debt covenant violations. Jha (2013) finds that US listed firms experiencing temporary financial distress manage their earnings upward in order to avoid debt covenant violations that may be costly for them.

Smith et al. (2001) study Australian listed firms using a multi-dimensional measure of financial distress and cluster firms into three groups, failing, distressed and healthy. They find that distressed non-failing firms are more likely to manage their earnings upward than non-distressed firms, while distressed firms filing for bankruptcy are less likely to engage in income increasing earnings management than other firms. Their findings are consistent with DeAngelo et al. (1994) who find that stressed firms are more likely to reveal their weak financial performance to stakeholders in order to renegotiate their debt on better terms and signal to stakeholders the manager's willingness to deal with these problems. Further, they argue that managers have an incentive to manage earnings downward in the case of close auditor and lender monitoring. However, Garcia Lara et al. (2009) find that UK failed firms manage earnings upward up to four years in advance of bankruptcy in order to mask weak performance, and that such firms use real activity-based earnings management where accruals-based earnings management is less effective or is complex to action (Nagar and Sen, 2016).

Some studies in the extant literature use firm bankruptcy as the signal of financial distress. Rosner (2003) studies failed US firms and finds that they manage earnings upward in the five years leading up to bankrupty. Charitou et al. (2007a, b) find that the managers of stressed US firms underestimate earnings in the period before they become bankrupt, providing evidence that firms close to failure are more likely to manage earnings downward than healthy firms due to the pressure exerted by auditors or lenders. Bisogno and De Luca (2015) find that Italian SMEs experiencing financial difficulties are more likely to manage earnings upward because of the need to obtain new funding from lenders. Nagar and Sen (2016) find that in their initial stages of distress, Indian listed firms are likely to cut indirect (SG&A) expenses, and when the distress becomes more severe, they increase such expenses while managing earnings upward instead by manipulating discretionary accruals. Their findings indicate that the type of earnings management behavior reflects the degree of financial distress.

The literature identifies a range of alternative proxies for financial distress. Habib et al. (2013) uses three different proxies for financial distress in a study of New Zealand listed firms: negative net income; current year working capital, where distressed firms are those exhibiting negative working capital in a given year; and a combined variable for firms showing negative net income and working capital. They find evidence that firms manage their earnings both upward and downward, and that distressed firms have lower leverage than their non-distressed counterparts, the latter indicating that higher leverage may not be a key driver of financial distress.

Finally, many studies employ Altman's Z-Score as a proxy for financial distress. This measure is a linear combination of five key business ratios, weighted by coefficients, thereby producing a more encompassing indicator of financial distress (Altman et al., 2017; Lubawa and Loungrath, 2016). Agrawal and Chatterjee (2015) investigate Indian listed firms classified as exhibiting either low or high distress risk according to Altman's Z-score. Their findings are interesting as they find that low-distress risk firms are more likely to manage their earnings upward than their higher distress risk counterparts, consistent with Jaggi and Lee (2002), who explain that while low distress firms try to mask weak financial performance (as managers hope their financial problems are temporary), the managers of highly distressed firms are likely to more honestly reflect their financial problems in order to restructure or renegotiate the firm's debts. Therefore, the earnings management behaviour of financially distressed firms depends on the severity of financial distress.

Hypothesis development

The extant literature provides evidence that managers of distressed firms may engage in income-increasing and income-decreasing earnings management initiatives depending on the incentives to do so. These two earnings management practices are consistent with the debt hypothesis (Watts and Zimmerman, 1986) and the control hypothesis (Jensen, 1986), respectively.

We know that non-listed firms are more likely to be financed by bank debt than listed firms (Van Tandeloo and Vanstraelen, 2008; Mafrolla and D'Amico, 2017), therefore, managers of these firms have an incentive to manage earnings upward to improve their financial performance and meet lenders' forecasts and expectations. However, Basel II regulations have facilitated banks' abilities to use software technology (Mafrolla and D'Amico, 2017) in order to estimate borrower creditworthiness (rating) based on both qualitative and quantitative borrowing information, including accounting information. Therefore, it is argued that banks have strengthened their monitoring and scrutiny role in assessing the borrowing capacity of their clients, expecially for those firms in financial difficulties. As a consequence, the managers of these firms are less likely to manage earnings downward, since accrual-based earnings management is a technique easily detectable by outsiders (Cohen et al., 2008). In this case,

Code	Description	Freq.	%	Number of firms
1	Mining, Quarrying, Agriculture, forestry and Fishing	540	0.62	60
2	Manufacturing	44,802	51.19	4,978
3	Water supply, electricity, gas	3,150	3.60	350
4	Construction, real estate activities	5,778	6.60	642
5	Wholesale and retail trade, transportation and services	29,025	33.16	3,225
6	Information and communication	2,736	3.13	304
7	Healthcare and social works	1,494	1.71	166
	Total	87,525	100%	9,725

earnings management may be very costly for the firm because it erodes its relationship with lenders, thereby reducing their trust in the firm. Consistent with the control hypothesis (Jensen, 1986), we propose the following hypothesis:

Italian non-listed firms experiencing financial problems are more likely to engage in income-decreasing earnings management initiatives than healthy firms.

RESEARCH METHODOLOGY

Sample selection

For the purposes of this study, all accounting, financial market, and corporate governance data are collected from the *Bureau van Dijk Aida Database* for the period 2009 to 2017. The AIDA Database covers 10 years, therefore when the data was collected 2008 was the first sample year available for analysis, while 2017 was the last. The year 2008 is used to calculate the change in some of the study variables, therefore our first sample year is 2009. The data consists of Italian non-listed stock corporations that, according to Italian civil law, are not obliged to prepare consolidated financial statements, and which have equity capital exceeding a threshold of €120,000. Consistent with these criteria, the population available in the database is 437,949 firms. From the population we exclude limited liability companies to address missing data issues, along with finance industry firms given the non-standard format of their financial statements and regulatory status, and firms filing simplified financial statements as they are not obliged to report certain financial information. After eliminating firms with insufficient data for the estimation of the variables in our empirical models, the final sample consists of a balanced sample of 9,725 non-listed firms, giving a total of 87,525 firm-year observations over the nine year sample period of 2009 to 2017. The use of a balanced firm sample allows us to include all active firms during the sample period. The number of firms in each industry is given in Table 1 along with their two-digit NACE industry code membership.

Table 1 shows that the sample firms available in the database are composed mainly of manufacturing firms (51.19% of sample firms) and by wholesale, retail, transportation and service sector firms (33.16% of sample firms). These firms represent around 85% of the sample, consistent with the wider Italian economy at the end of 2017, as noted by the Italian Institute of Statistics (ISTAT, 2018).

Identifying firms in financial difficulty

As discussed earlier, the literature identify several proxies for financial distress, including: debt covenant violation (DeFond and Jimbalvo, 1994; Jha, 2013); persistent loss occurrence (DeAngelo et al., 1994); bankruptcy status (Rosner, 2003; Garcia-Lara et al., 2009; Bisogno and De Luca, 2015); Ohlson's O-score default prediction model (Ranjbar and Farsad Amanollahi, 2018); firm free cash flows (Mohammadi and Amini, 2016); the Fich and Slezak (2008) ratio (Campa, 2019); and Altman's Z-Score (Agrawal and Chatterjee, 2015; Nagar and Sen, 2016; Campa, 2019), the latter used widely in the literature.

We do not use debt covenant violation as a proxy for the status of financial distress for two reasons. First, in Italy debt covenant information is not readily available as it is not mandatory and thus not shown in the financial reporting information. Second, Dichev and Skinner (2002) criticise the use of debt covenant violation as a proxy for financial distress as firms not violating debt covenants may also fail. Further, we do not use bankruptcy status as a proxy for financial distress as the data is not available on the Aida Database. Finally, we do not employ the indicators used in only a minority of studies, particularly given that the results of such studies are in any case similar to those using more standard proxies of financial distress. Our focus is therefore on the Altman Z-Score measure given its wide use and confirmed validity in predicting a firm's financial distress in non-listed firms (Altman and Hotchkiss, 2006; Altman et al., 2017). We argue that it provides a strong proxy for firm financial distress.

This study employed Altman's Z-Score as a proxy for financial distress for at least two reasons, consistent with Altman et al. (2017). First, the model is used not only to predict firm bankruptcy but also wider firm financial difficulties. Second, the measure uses accounting rather than market data and is therefore suitable for non-listed firms. Third, it is more widely accepted, understood and established as the primary measure of financial distress risk in the extant literature (Bisogno et al., 2018). Agrawal and Chatterjee (2015) note that Altman's Z-Score (hereafter, Z-Score) is a score of the overall financial health of a firm based on its available accounting data. It is composed of five indicators drawn from the financial statements of non-listed firms. Altman's original Z-Score (1968) model is parameterized as given in Equation 1:

$$Z = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.999X_5$$

(1)

where Z= Overall Index or Score; X_1 = Working Capital/Total Assets; X_2 = Retained Earnings/Total Assets; X_3 = Earnings before Interest and Taxes; X_4= Market Value of Equity/Book Value of Total Liabilities; X_5 = Sales/Total Assets.

The model was subsequently modified by Altman (1983) and Altman and Hotchkiss (2006) to apply to non-listed firms, as detailed in Equation 2:

$$Z' = 0.717X_1 + 0.847X_2 + 3.107X_3 + 0.420X_4 + 0.998X_5$$

(2)

where Z'= Overall Index or Score; X_1 = (Current Assets – Current Liabilities)/Total Assets; X_2 = Retained Earnings/Total Assets; X_3 = Earnings before Interest and Taxes/Total Assets; X_4= Book Value of Equity/Total Equity; X_5 = Sales/Total Assets.

Three zones are identified for the outcome of the Z-Score: a "safe-zone" where the Z-Score exceeds 2.90; a "Grey zone" where the Z-Score value falls between 1.23 and 2.90, where it is uncertain whether firms may or may not go bankrupt; and a "distress zone" where the Z-Score is lower than 1.23, indicating a high probability of distress and financial difficulties within a given time period (Altman and Hotchkiss, 2006). Therefore, the higher the Z-Score, the lower the probability that a firm fails. In this paper we investigate the relationship between the earnings management behaviour of non-listed firms and their Altman Z-Score. We operationalise this by means of a categorical financial distress variable which takes the value of 0 for observations in "safe-zone"; the value of 1 for observations in the "grey-zone", which includes firms not suffering severe financial problems, and the value of 2 for observations in the "distress zone", which includes firms in financial difficulty. Therefore, as the value of the categorical variable increases, the severity of firm financial problems increases.

Measurement of accrual-based earnings management

Consistent with the extant research, discretionary accruals are employed to proxy for accrual-based earnings management as they reflect subjective accounting choices made by the firm (Lazzem & Jilani, 2018). According to Yang et al. (2009), the higher the value of firm discretionary accruals, the greater that earnings are managed. Further, discretionary accruals may take the form of either income-increasing (positive discretionary) or income-decreasing (negative discretionary) accruals. For the purpose of this paper, we use signed discretionary accruals as a proxy for earnings management rather than their absolute value (Ugrin et al., 2017). Chen et al. (2007) argue that managers may inflate earnings (managing them upward) to make their firm financial performance more attractive to investors. Conversely, Givoly and Hayn (2000) argue that negative discretionary accruals indicate that economic losses are recognised in a timely fashion by the firm. Such earnings underestimation signals conservatism rather than managerial opportunism (Ugrin et al., 2017).

To decompose total accruals into its discretionary and non-discretionary components we use the Dechow et al. (1995) model. To control for heteroscedasticity, all of the model variables are standardised using opening total assets. This model is estimated using a cross-sectional approach, and so the coefficients are industry- and year-specific rather than firm-specific, the latter using a time series approach (Yang et al., 2009).

Total accruals at time t (TA_t) is defined as the difference between accounting earnings (net income before extraordinary items) and operating cash flows, consistent with Subramanyam (1996). However, since 2015, cash flow statements are not mandatory for Italian non-listed firms, and thus in this paper we estimate total accruals from the format of the financial statements adopted by such firms according to Italian civil law. Therefore, we define total accruals as given in Equation 3:

$$TA_t = (\Delta Current\ Assets_t - \Delta Cash_t) - (\Delta Current\ Liabilities_t) - Depreciation\ and\ Amortization$$

(3)

DeAngelo (1981) defines abnormal total accruals as the difference between total accruals and normal (expected) total accruals. Therefore, total accrual changes from the previous year to the current year can be separated into discretionary and non-discretionary accrual changes as given in Equation 4:

$$(\Delta TA)_t = (TA_t - TA_{t-1}) = (DA_t - DA_{t-1}) + (NA_t - NA_{t-1})$$

(4)

Applying the modified version of the Jones model (Dechow et al., 1995), total accruals can then be expressed as in Equation 5:

$$\frac{TA_t}{A_{t-1}} = \frac{\alpha}{A_{t-1}} + \beta_1 \frac{(\Delta REV_t - \Delta REC_t)}{A_{t-1}} + \beta_1 \frac{PPE_t}{A_{t-1}} + \varepsilon_t$$

(5)

where $TA_{i,t}$ = total accruals for firm i in year t; $\Delta REV_{i,t}$ = revenues for firm i in year t less revenues in year $t-1$; ΔREC_t = receivables for firm i in year t less receivables in year $t-1$; $PPE_{i,t}$ = property, plant and equipment + long-term deferred expenses for firm i in year t; $A_{i,t-1}$ = total assets in year $t-1$; and ε_t = the model error term.

To estimate the coefficients in Equation 5, we use a cross-sectional regression approach, including all firms within the same first two digit NACE code. The model implicitly assumes that all firms within a given industry and year share the same incentive for earnings manipulation. Consistent with Dechow et al. (1995), discretionary accruals are then calculated as the difference between total and expected accruals, that is, the error term in Equation 6.

$$DAC_{i,t} = \frac{TA_{i,t}}{A_{i,t-1}} - \left(\frac{\alpha}{Ai_{,t-1}} + \frac{\beta_1 (\Delta REV_{i,t} - \Delta REC_{i,t})}{A_{i,t-1}} + \frac{\beta_2 (PPE_{i,t})}{A_{i,t-1}} + \varepsilon_t \right)$$

(6)

As we hypothesise that firms experiencing financial difficulties are likely to manage their earnings downward, we focus on income-decreasing earnings management as the dependent variable in the main model, Model 1. In addition, we propose an additional control model using income-increasing earnings management (Model 2) as dependent variable. If our hypothesis is supported, in Model 1 we expect a significant positive relationship between the degree of financial distress and the dependent variable EM1 (the income-decreasing earnings management), as managers may manage earnings downward when the severity of their financial difficulties increase. As a consequence, in Model 2 we expect a negative relationship between the degree of financial distress and the dependent variable EM2 (income-increasing earnings management).

To compute negative discretionary accruals (dependent variable EM1) all positive values of discretionary accruals are set to zero to reflect only income-decreasing earnings management. The second measure of earnings management (dependent variable EM2) captures positive abnormal accruals, and so all negative values of discretionary accruals are set to zero to reflect income-increasing earnings management alone.

The empirical model

To test our hypothesis, the model given in Equation 7 is estimated in order to examine the relationship between signed discretionary accruals and financial distress risk for non-listed firms. We introduce Altman's Z-Score as a categorical variable labelled *DISTRESS*. The variable takes the value of 0 for observations in

$$EM_{i,t} = \alpha_i + \beta_1 DISTRESS_{i,t} + \beta_2 LEV_{i,t} + \beta_3 GROW_{i,t} + \beta_4 ROA_{i,t} + \beta_5 SIZE_{i,t} +$$

$$\beta_6 TAX_{i,t} + \beta_7 TACC_{i,t} + \beta_8 DEBTCH_{i,t} + \beta_9 EQUCH_{i,t} + \varepsilon_{i,t}$$

(7)

the safe zone (where the Z-Score is greater than 2.9), the value of 1 for observations in the grey area (where the Z-Score is between 1.23 and 2.9), and the value of 2 for observations in the distress zone (where the Z-Score is lower than 1.23). where $EM_{i,t}$ is the dependent variable of the main model (M1), reflecting income-decreasing earnings management, computed according to the modified Jones' model (Dechow et al., 1995). We also employ the following control dependent variable: EM2 which proxies for income-increasing earnings management. Here after we list the testing and control variables. $DISTRESS_{i,t}$ = categorical variable for Altman's Z-Score, assuming the value of 0 for observations in safe zone, 1 for observations falling into the grey area, and 2 for observations falling into the distressed zone. In the regression model, the base for the categorical variable is zero. $LEV_{i,t}$ = firm leverage, measured as loans to total assets; $SIZE_{i,t}$ = natural logarithm of total assets; $GROW_{i,t}$ = firm's growth rate measured as the percentage annual change in revenues; $TAX_{i,t}$ = tax burden measured as the sum of tax payables and deferred taxes, scaled by income before taxes; $ROA_{i,t}$ = return on assets ratio; $TACC_{i,t}$ = the signed value of total accruals; $DEBTCH_{i,t}$ = dummy variable taking the value of 1 if a firm issued new debt compared to the previous year; $EQUCH_{i,t}$ = dummy variable taking the value of 1 if a firm issued new equity compared to the previous year; and $\varepsilon_{i,t}$ = model error term.

The test variable *DISTRESS* is categorical such that it takes the value 0 for observations in the safe zone, the value 1 for observations in the grey zone, and the value 2 for observations in the distressed zone. In the regression model, we use the categorical dependent variable of zero (safe zone) as the base. Therefore, we expect a positive sign for the variable *DISTRESS* assuming the value of 1 (grey zone) and 2 (distress zone). These findings would suggest that with an increase in financial difficulties, firms are more likely to engage in income-decreasing earnings management initiatives than healthy firms (where the variable *DISTRESS* assumes the value of zero). In other words, as the dependent variable *EM1* proxies negative discretionary accruals, we expect that the greater are the firm's financial difficulties, the greater are income-decreasing earnings managements initiatives. This is consistent with the control hypothesis (Jensen, 1986).

Consistent with the extant research examining the determinants of earnings management, Equation 7 includes several control variables (Dechow et al., 1995; Kothari et al., 2005; Jelinek, 2007; Dechow et al., 2010; Mariani et al., 2010; Bisogno, 2012; Habib et al., 2013; Shan et al., 2013; Agrawal and Chatterjee, 2015; Bisogno and De Luca, 2016; Humeedat, 2018; Lazzem and Jilani, 2018; Ranjbar and Farsad Amanollahi, 2018; Campa, 2019) which are likely to impact on earnings management initiatives.

This study controls for the impact of leverage on earnings management. The literature provides mixed findings about the relationship between leverage and accrual-based earnings management. Because Italian non-listed firms rely more on external capital to finance their operations (Mafrolla and D'Amico, 2017), it is

argued that managers of firms in financial difficulties attempt to manage their earnings downward. As lenders estimate borrower creditworthiness focusing on accounting information, there could be high political costs (Watts and Zimmerman, 1978) if they discover earnings management initiatives (Mafrolla and D'Amico, 2017). Therefore, non-listed firms are monitored closely by lenders and we expect that more highly leveraged firms are more likely to manage earnings downward than lower leveraged firms, consistent with the control hypothesis (Jensen, 1986).

This study controls for firm growth (proxied by the change in sales) as it impacts on the degree of earnings management. Skinner and Sloan (2002) argue that the market penalises growing firms in the case of negative earnings surprises. In addition, the managers of growing firms may have an incentive to smooth earnings by managing accruals since earnings volatility may increase firm risk (Beaver et al., 1970). Gorganli and Vakilifard (2014) argue for a positive relationship between firm growth and accounting discretion in listed firms, though find a negative relationship between the two, indicating that managers of firms with growth opportunities engage less in earnings management. Therefore, we expect a positive relationship between firm growth and negative abnormal accruals (income-decreasing earnings management).

This study controls for firm profitability. DeAngelo et al. (1994) argue, and find evidence, that managers of firms experiencing financial difficulties are less likely to inflate earnings to mask their poor financial performances, and such firms are instead likely to manage earnings downward. By reducing their reported earnings, managers attempt to signal to lenders and other creditors their financial difficulties in order to negotiate better terms in contract renegotiations. Therefore, managers of firms experiencing financial difficulties are likely to manage earnings downward. Agrawal and Chatterjee (2015) find a negative relationship between discretionary accruals and firm profitability for listed firms, suggesting an income-decreasing earnings management strategy. Thus, we expect a positive relationship between firm profitability and income-decreasing earnings management.

The study controls for the impact of firm size on earnings management, though there are competing views on the direction of relation. One view is that larger firms are less likely to manage earnings than other firms as they have better internal control systems to reveal such activity (Francis et al., 1999), and that such activity would damage their financial market reputation (Charitou et al., 2011; Habib et al., 2013; Nalarreason et al., 2019). Further, larger (listed) firms are in general audited by more highly qualified and competent auditors that limit earnings management behaviour. The altenative view argues that larger firms are more likely to manage their earnings than other firms given their concern to meet analysts expectations and their greater bargaining power with auditors (Habib et al., 2013; Agrawal and Chatterjee, 2015). Campa (2019) finds a negative relationship between income-increasing discretionary accruals and firm size in French listed and non-listed

Table 2. Variable description and measurement.

Label	Variable description	
$EM_{i,t}$	Accrual-based earnings management dependent variable computed using the modified Jones's model (Dechow et al., 1995). We decompose accruals into two categories according to the sign of the abnormal accruals. Therefore we create the two following variables: $EM1$ = income-decreasing earnings management; $EM2$ = income-increasing earnings management. Our testing variable is EM1, while EM2 is a control variable.	
Testing variable		Expected sign with EM1
$DISTRESS_{i,t}$	Altman's Z-Score for non-listed firms (Altman, 2000). The categorical indicator takes the value of 0 for firms with an Z-Score exceeding 2.9 (healthy firms), the value of 1 for firms with an Z-Score between 1.23 and 2.9 (firms in the grey area), and the value of 2 for firms with an Z-Score lower than 1.23 (distressed firms).	+
Control variable		Expected sign with EM1
$LEV_{i,t}$	Firm leverage, measured as the ratio of debt to total assets	+
$SIZE_{i,t}$	Firm size, measured as the natural logarithm of total assets	+
$GROW_{i,t}$	Firm growth, measured as the percentage annual change in sales revenue	+
$ROA_{i,t}$	Firm profitability, measured as the return on assets ratio	+
$TAX_{i,t}$	Firm tax burden, measured as the sum of tax payables and deferred taxes to income before taxes	+
$TACC_{i,t}$	Firm total accruals, measured as the signed value of firm total accruals	-
$DEBTCH_{i,t}$	Dummy variable which takes the value of 1 if the firm issued new debt within the last year, and 0 if it did not	-
$EQUCH_{i,t}$	Dummy variable which takes the value 1 if the firm issued new equity within the last year, and 0 if it did not	-

firms. Francis et al. (1999) argued that larger non-listed firms are less likely to manage their earnings due to better internal control systems. The majority of Italian listed and non-listed firms adopt the traditional corporate governance model and are therefore subject to an administrative audit carried out by an internal though independent statutory committee (Board of Statutory Auditors) that should increase the quality of their internal control systems (Bisogno, 2012; Bisogno and De Luca, 2016). Therefore, we expect a positive relationship between firm size and income-decreasing earnings management in Italian non-listed firms.

This study controls for the impact of taxation on the magnitude of discretionary accruals as the extant literature finds that managers of firms tend to underestimate earnings when the tax burden for the year increases (Burgstahler et al., 2006; Coppens and Peek, 2005; Poli, 2013b). Garrod et al. (2007) argue that profitable firms underestimate earnings to minimize tax payments as they attempt to avoid the political cost of a tax audit that may be costly for the firm, and find evidence of this. Thus, non-listed firms may engage in income-decreasing earnings management to minimise corporate tax payments. Therefore, we expect a positive sign between income-decreasing initiatives and the size of corporate tax payments.

This study also controls for the impact of total accruals on earnings management since the literature finds that firms with greater total accruals make higher discretionary accruals. Francis et al. (1999) argue that firms generating higher accruals have a greater incentive to manipulate earnings aggressively and opportunistically. Therefore, a negative relation is expected for this control variable and income-decreasing earnings management.

Finally, we control for the impact of debt or equity issuance as Shan et al. (2013) find that firms with large external financing cash inflows (outflows) tend to engage in income-increasing (decreasing) earnings management, regardless of whether their financing is via debt or equity. Campa (2019) finds a positive relationship between debt and equity issuance and the level of positive discretionary accruals, indicating the use of income-increasing earnings management initiatives. Therefore, we expect a negative relationship between the magnitude of negative discretionary accruals (income-decreasing earnings management initiatives) and debt and equity issuance.

The model coefficients are calculated using robust standard errors clustered by firms and years, consistent with Petersen (2009). Table 2 provides more detailed definitions of the model variables, along with expected coefficient signs.

Data analysis

Descriptive statistics

Table 3 gives the descriptive statistics for our continuous model variables. Panel A shows the descriptive statistics for the full

Table 3. Descriptive statistics for the continuous model variables.

Variable	Mean	Std. dev.	Var.	Min.	Max.	25th	Median	75th
PANEL A Full sample (Number of firms = 9,725; Number of observations = 87,525)								
EM1	-0.030	0.054	0.003	-0.294	0	-0.041	0	0
EM2	0.031	0.053	0.003	0	0.278	0	0	0.042
LEV	0.213	0.179	0.031	0.000	0.656	0.045	0.194	0.345
GROW	0.493	59.054	3847.34	-1	16,425.7	-0.059	0.023	0.115
ROA	0.043	0.089	0.008	-2.701	3.751	0.008	0.027	0.069
SIZE	10.051	1.086	1.179	4.260	16.998	9.313	9.896	10.640
TAX	0.404	0.564	0.318	-1.997	3.511	0.275	0.371	0.549
TACC	-0.027	0.119	0.014	-9.139	5.703	-0.069	-0.026	0.014
PANEL B Firms with Altman's Z-Score of 0 (healthy firms) (Observations = 8,215; 9.39%)								
EM1	0.028	0.055	0.003	-0.294	0	-0.033	0	0
EM2	0.041	0.060	0.004	0	0.287	0	0.014	0.060
LEV	0.189	0.187	0.035	-0.007	0.937	0.009	0.143	0.312
GROW	0.331	13.967	195.07	-1	1255.74	-0.034	0.570	0.180
ROA	0.062	0.118	0.014	-1.223	1.286	0.012	0.386	0.096
SIZE	9.613	1.134	1.287	4.260	16.203	8.837	9.446	10.199
TAX	0.394	0.519	0.270	-1.997	3.511	0.298	0.364	0.503
TACC	-0.013	0.114	0.013	-1.327	1.706	-0.060	-0.013	0.032
PANEL C Firms with Altman's Z-Score of 1 (firms in grey-area) (Observations = 60,760; 69.42%)								
EM1	-0.029	0.050	0.002	-0.293	0	-0.040	0	0
EM2	0.031	0.052	0.003	0	0.287	0	0.002	0.044
LEV	0.207	0.174	0.030	-0.025	0.897	0.040	0.187	0.339
GROW	0.588	70.288	4,949.4	-0.999	16,425.7	-0.052	0.027	0.116
ROA	0.051	0.081	0.007	-1.921	3.751	0.011	0.033	0.078
SIZE	9.935	0.988	0.977	4.532	16.400	9.268	9.799	10.474
TAX	0.419	0.537	0.288	-1.997	3.511	0.297	0.376	0.546
TACC	-0.025	0.098	0.009	-2.336	2.426	-0.068	-0.026	0.016
PANEL D Firms with Altman's Z-Score of 2 (distressed firms) (Observations = 18,550; 21.19%)								
EM1	-0.037	0.063	0.004	-0.294	0	-0.049	-0.007	0
EM2	0.025	0.051	0.003	0	0.287	0	0	0.029
LEV	0.244	0.185	0.034	-0.042	3.333	0.086	0.239	0.373
GROW	0.253	13.631	185.81	-1	1,767.75	-0.100	0.001	0.082
ROA	0.011	0.092	0.009	-2.701	1.220	0.000	0.011	0.033
SIZE	10.627	1.154	1.331	5.792	16.998	9.803	10.454	11.277
TAX	0.360	0.659	0.434	-1.997	3.511	0.065	0.348	0.585
TACC	-0.042	0.171	0.029	-9.139	5.703	-0.076	-0.033	0.002

The table shows the descriptive statistics for dependent and independent continuous variables. Variable descriptions and measurement are provided in Table 2.

sample, while panel B shows the descriptive statistics for firms grouped by the *DISTRESS* test categorical variable. Panel A shows the descriptive statistics for the full sample of 9,725 firms and 87,525 observations. Untabulated statistics show that 49.16% (43,024) of sample firm-year observations evidence income-decreasing earnings management, while 50.84% (44,501) of the firm-year observations evidence income-increasing discretionary accruals, suggesting that, on average, sample firms are quite balanced between managers engaging in both income-decreasing and income-increasing earnings management initiatives. With regard to the full sample, the dependent variable for income-decreasing earnings management, *EM1*, has a mean of -0.030, while the (control) dependent variable *EM2* for income-increasing earnings management has a mean of 0.031.

Firms in the total sample have a mean financial leverage ratio of 0.213, indicating that bank loans are around 21.3% of firm total assets. Firms have a mean growth rate of 49.3%, and firm profitability shows that net income is around 4.3% of total assets. Average firm size (natural logarithm of total assets) is 10.051 (or around 23 million euros). On average, firms have tax payable and

Table 4. Descriptive statistics for the dummy and the categorical variables.

Variable	Full sample				Distress = 0				Distress = 1				Distress = 2			
	0		1		0		1		0		1		0		1	
					PANEL A Dummy variable											
	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%
DEBTCH	40,930	46.76	46,595	53.24	3,406	41.46	4,809	58.54	28,331	46.63	32,429	53.37	9,193	49.56	9,357	50.44
EQUTCH	82,358	94.10	5,167	5.90	7,595	92.45	620	7.55	57,256	94.23	3,504	5.77	17,507	94.38	1,043	5.62

	PANEL B Categorical variable					
	0 *(safe zone)*		1 *(grey zone)*		2 *(distressed zone)*	
	N.	%	N.	%	N.	%
DISTRESS	8,215	9.39	60.760	69.42	18,550	21.19

This table shows the descriptive statistics for independent dummy variables. Variable descriptions and measurement are provided in Table 2.

accrued tax burden of around 40.4% of net income before taxes. Firm sample total accruals are, on average, -0.027.

In addition, we analyse the characteristics of firms grouped according to their financial situation (safe zone, grey zone or distress zone) to observe the earnings management initiatives engaged in by firms according to their Z-Score. We therefore examine descriptive statistics of our continuous dependent and independent variables for sample firms grouped by the *DISTRESS* categorical variable in Panels B to D.

The dependent variable *EM1,* which captures income-decreasing earnings management, has a mean of 0.028 for firms in the safe zone (9.39% of firm-year observations), a mean of -0.029 for firms in the grey zone (69.42% of firm-year observations), and a mean of -0.037 for firms in the distress zone (21.19% of firm-year observations). These findings suggest that managers of firms in the distress zone are more likely to manage earnings downward than managers of other firms.

In order to control for the impact of the testing and independent variables on the income-increasing earning management initiatives, we also use the control dependent variable *EM2*. This control variable captures income-increasing earnings management (that inflate earnings) has a mean of 0.041 for firms in the safe zone (9.39% of firm-year observations), a mean of 0.031 for firms in the grey zone (69.42% of firm-year observations), and a mean of 0.025 for firms in the distress zone (21.19% of firm-year

observations). This findings suggest that managers of distressed firms are less likely to manage earnings upward than other firms, while firms in the grey zone are likely to manage earnings upward heavily.

The financial leverage variable, *LEV*, shows that 18.9% of total assets are financed by bank loans for firms in the safe zone, while the ratio is 20.7% for firms in the grey zone, and 24.4% for firms in the distressed zone. Clearly, financial difficulties increase with firm leverage.

The sales growth variable, *GROW*, the net sales from the previous year, has a mean of 33.1% for firm-year observations in the safe zone, 58.8% for firm-year observations in grey zone, and 25.3% for firm-year observations in distress zone. Thus, firms in the grey zone tend to enjoy better growth than other sample firms. Firm profitability, *ROA*, is around 6.2% for firms in the safe zone, 5.1% for firms in the grey zone, and 1.1% for firms in the distress zone. Thus, as expected, firm profitability tends to deteriorate as financial difficulties deepen. Firm size, *SIZE*, (natural logarithm of total assets) has a mean of 9.613 for firms in the safe zone, 9.935 for firms in the grey zone firms, and 10.627 for distress zone firms. Thus, distressed firms tend to be larger than other firms, and grey zone firms tend to be larger than healthy firms. The variable which gauges the tax burden, *TAX*, shows that taxes are 39.4% of income before taxes for firms in the safe zone, 41.9% for firms in the grey zone, and 36% for firms in the distressed zone. Finally, the table shows that signed total

accruals of -0.013, -0.025, and -0.042 are generated by safe zone, grey zone and distressed zone firms, respectively.

Table 4 shows descriptive statistics for the dummy and categorical variables in our model. Panel A reveals that 53.24% of sample firms (46,595 firm-year observations) increased their total debt (*DEBTCH*) while only 5.90% of firms (7,595 firm-year observations) increased their equity (*EQUTCH*) during the year. Descriptive statistics for firms grouped by the financial distress risk categorical variable, *DISTRESS*, indicate that firms in the distressed zone (*DISTRESS* = 2) tend to increase their debt somewhat less (50.44%) than other firms. 53.3% of firms in the grey zone (*DISTRESS* = 1) and 58.54% of firms in the safe zone (*DISTRESS* = 0) increase their debt compared to the previous year.

These findings suggest that while healthy firms are more likely to increase their debt to finance their operations, firms in financial difficulty may be less able to do so given their increased financial risk as a borrowing proposition and the fact that they may be required to repay their loans before maturity if they breach covenant requirements. Futher, firms in the safe zone are more likely to increase equity (7.55% of firm-year observations) to finance their operations than financially riskier firms (5.77% and 5.62% of firm-year observations in the grey and distressed zones, respectively). Therefore, as firm financial situations deteriorate, they will encounter greater difficulty accessing

either debt or equity financing.

Table 4, panel B, shows that 9.39% of the (8,215) observations fall in the safe zone (Z-Score coded 0), 69.42% of the (60,760) observations fall in the grey area (Z-Score coded 1), and 21.19% of the (18,550) observations fall in the distress zone (Z-Score coded 2). Thus, less than 10% of firms are classed as healthy, while around 70% may experience some financial difficulties and around 21% are distressed.

Correlation analysis

Table 5 shows a correlation matrix for the full sample of firms with Pearson (Spearman) correlations given below (above) the diagonal. To capture the relationship between financial distress risk and earnings management initiatives, we examine the categorical test variable, *DISTRESS*, whereby the safe zone is coded 0, the grey zone is coded 1, and the distressed zone is coded 2.

The table shows a negative Pearson correlation of 0.015 between the dependent variable *EM1* (income-decreasing earnings management) and the test variable *DISTRESS* when it takes the value 0 (safe zone) which is significant at 1% level. There is a significant positive Pearson correlation (0.050) at 1% level, between the dependent variable *EM1* and *DISTRESS* when it takes the values of 1, the grey zone, and a negative Pearson correlation (-0.066), significant at 1% level, between the dependent variable *EM1* and *DISTRESS* when it takes the values of 2, the distress zone. The Pearson correlation is positive (0.062) and significant at 1% level, between the income-increasing earnings management dependent variable *EM2* and *DISTRESS* when it takes the value 0 (safe zone). There is a positive correlation of 0.009 which is significant at the 1% level between *EM2* and *DISTRESS* when it takes the value 1 (grey zone), and a negative correlation of -0.055 between *EM2* and *DISTRESS* when it takes the value 2 (distressed zone). These findings suggest that managers of distressed firms are likely to engage less in income-decreasing earnings management (EM1) and less in income-increasing earnings management initiatives (EM2).

The table shows a negative Pearson correlation which is not significant between *EM1* and *LEV* and the control variables *GROW and EQUTCH,* while the correlation is positive, though insignificant between *EM1* and *SIZE* and *TAX*. The Pearson correlation is positive and significant at the 1% level between *EM1* and the control variables *ROA* (0.163) and *TACC* (0.693). Finally, the correlation is negative and significant at the 1% level between *EM1* and *DEBTCH* (-0.070).

The table shows a positive Pearson correlation, which is significant at the 1% level, between *EM2* and *ROA* (0.170), *TACC* (0.679) and *EQUTCH* (0.051). There is a negative correlation, which is significant at the 1% level, between *EM2* and *LEV* (-0.074), *SIZE* (-0.026), and *DEBTCH* (-0.092).

Leverage is correlated negatively with both income-decreasing (*EM1*) and income-increasing (*EM2*) earnings management initiatives, indicating that leveraged firms, consistent with De Angelo et al. (1994), are likely to reduce earnings management initiatives. Firms issuing new debt and larger firms are likely to increase income-decreasing (*EM1*) and reduce income-increasing earnings management (*EM2*), indicating that such firms are likely to smooth their earnings. The positive correlations between both *EM1* and *EM2* and *TACC* suggest that the overall measure of earnings management (proxied by both income-decreasing and income-increasing earnings management initiatives) are related to the overall measure of total accruals, as in the previous literature. There is a positive Pearson correlation, significant at the 1% level, between the control variables *ROA* and *DISTRESS* when it takes the value 0 (0.066) and 1 (0.125), while the correlation is negative and significant at the 1% level when *DISTRESS* takes the value 2 (-0.187). These findings confirm that firms in the safe and grey zones

are in general more profitable than distressed firms. Moreover, the Pearson correlation between *ROA* and *LEV* is negative (-0.276) and significant at the 1% level, suggesting that more leveraged firms have lower profitability due in part to the interest paid on loans. The correlation between *SIZE* and *DISTRESS* when it takes the value 0 (safe zone) and 1 (grey zone) are negative and significant at the 1% level (-0.130 and -0.162, respectively), though it is positive and significant at the 1% level when *DISTRESS* takes the value 2 (distressed zone). Therefore, distressed firms tend to be larger than other firms.

RESULTS AND DISCUSSION

Table 6 presents the results of our empirical model to test the impact of firm financial difficulties on earnings management behaviour. Consistent with Campa (2019), the model uses the categorical test variable *DISTRESS* which takes the value 0 when the Z-Score is higher than 2.9 (safe zone), the value 1 when it lies between 1.23 and 2.9 (grey zone), and 2 when it falls below 1.23 (distressed zone).

From our hypothesis which is based on the control hypothesis (Jensen, 1986) we expect a positive relationship between financial distress risk (Z-Score) and income-decreasing earnings management behaviour (dependent variable EM1). Consistent with DeAngelo et al. (1994), we expect that firms suffering from financial difficulties (high Z-Scores) are likely to manage their earnings downward. Therefore, we expect a positive relationship between the categorical independent variable DISTRESS and the dependent variable EM1, proxying the income-decreasing accrual-based earnings management(negative discretionary accruals). To confirm our hypothesis, we also employ a dependent control variable, EM2, reflecting income-increasing earnings management (positive discretionary accruals). Therefore, we compare the findings of our main Model 1 (dependent variable EM1) with those of the control Model 2 (dependent control variable EM2). We run an ordinary least squares regression with robust standard errors clustered by both firm and year, consistent with Petersen (2009). This helps us to control for autocorrelation and heteroscedasticity. Further, the model controls for both industry sector and year. Our main empirical model, Model 1 with *EM1* as dependent, has an R-square of 67.26% and an F-test significant at the 1% level. The control Model 2 (using EM2 as dependent variable), has an R-square of 65.97%, with an F-test significant at the 1% level. The test categorical variable, *DISTRESS*, has three categories: 0 for the safe zone, 1 for the grey zone, and 2 for the distressed zone. Since the purpose of this paper is to investigate whether the severity of a firm's financial problems induces managers to manage their earnings downward, we employ the safe zone as the base case in our regression model. We first comment on the findings of Model 1, the negative value of discretionary accruals (income-decreasing earnings management) as the dependent variable.

Table 5. Correlation matrix for the model variables (full sample).

Correlation	EM1	EM2	SAFE	GRAY	DISTRESS	LEV	GROW	ROA	SIZE	TAX	TACC	DEBTCH	EQUTCH
EM1	1	0.857**	0.044**	0.028**	-0.064**	-0.031**	0.054**	0.146**	-0.004	0.048**	0.926**	-0.092**	0.016**
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.250)	(0.000)	(0.000)	(0.000)	(0.000)
EM2	0.329**	1	0.066**	0.026**	-0.076**	-0.071**	0.054**	0.179**	-0.032**	-0.003	0.932**	-0.093**	0.036**
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.316)	(0.000)	(0.000)	(0.000)
SAFE	0.015**	0.062**	1	-0.485**	-0.167**	-0.056**	0.079**	0.066**	-0.141**	-0.007*	0.060**	0.034**	0.022**
	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.039)	(0.000)	(0.000)	(0.000)
GRAY	0.050**	0.009**	-0.485**	1	-0.781**	-0.046**	0.043**	0.180**	-0.152**	0.070**	0.026**	0.004	-0.009**
	(0.000)	(0.008)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.224)	(0.010)
DISTRESS	-0.066**	-0.055**	-0.167**	-0.781**	1	0.092**	-0.106**	-0.250**	0.271**	-0.074**	-0.072**	-0.029**	-0.006
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.068)
LEV	-0.005	-0.074**	-0.044**	-0.053**	0.091**	1	0.001	-0.322**	0.080**	0.118**	-0.056**	0.044**	0.069**
	(0.129)	(0.000)	(0.000)	(0.000)	(0.000)		(0.807)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GROW	-0.001	0.003	-0.001	0.002	-0,002	-0.001	1	0.239**	-0.003	0.056**	0.042**	0.288**	0.043**
	(0.695)	(0.352)	(0.794)	(0.473)	(0.533)	(0.688)		(0.000)	(0.423)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.163**	0.170**	0.066*	0.125**	-0.187**	-0.276**	0.000	1	-0.066**	-0.007*	0.173**	0.034**	-0.028**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.950)		(0.000)	(0.027)	(0.000)	(0.000)	(0.000)
SIZE	0.004	-0.026**	-0.130**	-0.162**	0.275**	0.062**	-0.001	-0.060**	1	-0.136**	-0.022**	-0.006	0.033**
	(0.273)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.854)	(0.000)		(0.000)	(0.000)	(0.076)	(0.000)
TAX	0.000	-0.003	-0. 001	0.006	-0.006	-0.002	0.000	-0.001	-0.006	1	0.020**	0.014**	-0.002
	(0.957)	(0.324)	(0.744)	(0.076)	(0.078)	(0.555)	(0.953)	(0.863)	(0.075)		(0.000)	(0.000)	(0.586)
TACC	0.693**	0.679**	0.039**	0.033**	-0.065**	-0.045**	-0.001	0.254**	-0.019**	-0.002	1	-0.102**	0.027**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.706)	(0.000)	(0.000)	(0.653)		(0.000)	(0.000)
DEBTCH	-0.070**	-0.092**	0.034**	0.004	-0.029**	0.041**	0.006	0.017**	-0.004	-0.004	-0.083**	1	0.022**
	(0.000)	(0.000)	(0.000)	(0.224)	(0.000)	(0.000)	(0.078)	(0.000)	(0.224)	(0.287)	(0.000)		(0.000)
EQUTCH	-0.004	0.051**	0.022**	-0.009**	-0.006	0.067**	0.016**	-0.028**	0.037**	0.000	0.020**	0.022**	1
	(0.281)	(0.000)	(0.000)	(0.010)	(0.068)	(0.000)	(0.000)	(0.000)	(0.000)	(0.975)	(0.000)	(0.000)	

The table shows the Pearson (Spearman) correlation below (above) the median. *= 5% level of significance; ** = 1% level of significance.

The results show that the *DISTRESS* variable coefficient is positive, as expected, and significant at the 1% level for firms in both the grey and distress zones. These findings indicate that when the financial difficulties increase managers of these firms are likely to manage their earnings downward. The results are consistent with the prior literature (De Angelo et al., 1994; Charitou et al., 2007a, b; Campa, 2019) and suggest that managers of firms in financial distress face political costs (Watts and Zimmerman, 1978) related to the increased monitoring and scrutiny of outsiders (mainly creditors and lenders). The findings are also confirmed by the coefficients of the *DISTRESS* variable in Model 2 which for firms in the grey and distress zone has a negative sign which is significant at the 1% level. These findings suggest that there is a negative relation between firm financial difficulties and the probability of managing earnings upward. In conclusion, consistent with DeAngelo et al. (1994), stressed firms are more likely to reveal their weak financial performance to stakeholders in order to renegotiate their debt on better terms and to signal to stakeholders the manager's willingness to deal with these problems. Further, DeAngelo et al. argue that managers have an incentive to manage earnings downward in the case of close auditor and lender monitoring, as noted by Etemadi et al. (2013). Within the traditional corporate governance system, adopted by the majority of Italian listed and non-listed firms, the Board of Statutory Auditors (BSA), an independent and skilled statutory auditor which submits firms to frequent administrative audit (Bisogno, 2012), works to monitor the day-to-day prudence of operations on behalf of both minority shareholders and external stakeholders. Therefore, we find support for our central hypothesis.

The possible incentives motivating managers to decrease firm earnings when firms experience financial difficulties was examined by examining the model control variables. In Model 1, *LEV* is positive and significant at the 1% level and thus, consistent with expectations, more indebted firms are more likely to manage their earnings downward. The result is consistent with Jensen's (1986) control hypothesis, which indicates a negative relationship between leverage and earnings management (that is, firms managing earnings downward) due to the scrutiny and the monitoring role of outsiders (including lenders). This finding may be also explained by managers having an incentive to report financial difficulties in order to obtain better conditions in debt renegotiations (De Angeloet al., 1994). Further, since firms in financial difficulties are under the monitoring and scrutiny of lenders, an income-increasing earnings management initiative would be costly since discretionary accruals may be easily detected by outsiders (Graham et al., 2005). The finding is also confirmed by the negative *LEV* coefficient in Model 2, which is significant at the 1% level, indicating that leveraged firms engage less in income-increasing earnings management initiatives.

The coefficient of the control variable *GROWTH*, measured as the change in net sales, is positive, as expected, though it is not significant in Model 1. This finding is not consistent with Gorganli and Vakilifard (2014). The sign of this control variable in Model 2 indicates that managers with growth opportunities are also more likely to engage in income-increasing earnings management.

The coefficient of the profitability control variable *ROA* is positive, though it is not significant in the main Model 1. In Model 2, contrary to the extant literature (Dichev and Skinner, 2002; Agrawal and Chatterjee, 2015), we find a not insignificant relationship between firm profitability and income-increasing earnings management.

In Model 1, the coefficient of the control variable firm size (*SIZE)* is positive, consistent with expectations, and is significant at the 1% level. This indicates that managers of larger non-listed firms experiencing financial difficulties have more incentive to manage earnings downward. The control Model 2 which focuses on income-increasing earnings management, shows a negative relationship between firm size and (income-increasing) earnings management which is significant at the 1% level. This finding, consistent with the prior literature (Francis et al., 1999), indicates that larger firms are less likely to manage earnings upward because of their better internal control systems. The results across the two models suggest that the managers of larger firms manage their earnings to meet an expected earnings level in order to avoid political costs (Garrod et al., 2007) related to financial distress, for example to avoid debt covenant restrictions.

As expected, in Model 1, the tax burden, *TAX*, is significantly positively associated with income-decreasing earnings management at the 1% level. Thus, firms reduce reported earnings in order to minimise corporate tax payments (Garrod et al., 2007) while attempting to avoid a tax audit (a political cost). This finding is consistent with the prior literature (Burgstahler et al., 2006; Coppens and Peek, 2005; Garrod et al., 2007; Van Tendeloo and Vanstraelen, 2008). Model 2 confirms this relationship since the variable *TAX* has a negative and significant sign at 1% level.

The coefficient of the total accruals variable *TACC* is positive, contrary to expectations, and is significant at the 1% level. This finding is not consistent with Francis et al. (1999), who find that firms generating higher total accruals are more likely to manage their reported earnings upward. This finding is underpinned by the positive and significant coefficient at 1% level for the variable *TACC* in Model 2.

The coefficient of the new debt issue variable, *DEBTCH*, is positive, contrary to expectations, and significant at the 1% level in Model 1. This finding is not consistent with Shan et al. (2003), while it is consistent with Campa (2019). This finding, consistent with the Jensen' control hypothesis, indicates that managers of

Table 6. Linear regression model of the determinants of earnings management (main model).

Variable	Expected sign	Model 1 (main model): Dependent variable *EM1* (negative DA) (obs. 43,024 = 49.16%)				Model 2 (control model): Dependent variable *EM2* (positive DA) (obs. 44,501 = 50.84%)			
		Coeff.	St. err.	p-value	Sig.	Coeff.	St. err.	p-value	Sig.
Test variable									
DISTRESS:									
Grey zone	+	0.003	0.000	0.000	***	-0.004	0.000	0.000	***
Distress zone	+	0.002	0.000	0.000	***	-0.003	0.000	0000	***
Control variable									
LEV	+	0.011	0.001	0.000	***	-0.010	0.001	0.000	***
GROW	+	0.001	0.001	0.212	***	0.006	0.002	0.000	***
ROA	+	0.003	0.003	0.207	***	-0.003	0.002	0.292	
SIZE	+	0.001	0.000	0.000	***	-0.001	0.000	0.000	***
TAX	+	0.003	0.000	0.000	***	-0.003	0.000	0.000	***
TACC	-	0.506	0.003	0.000	***	0.489	0.003	0.000	***
DEBTCH	-	0.001	0.000	0.000	***	-0.002	0.000	0.000	***
EQUTCH	-	-0.006	0.000	0.000	***	0.006	0.000	0.000	***
constant		-0.035	0.002	0.000	***	0.064	0.002	0.000	***
Sample firms (balanced):		**Model 1 description:**				**Model 2 description:**			
N° firms: 9,725		F(16, 87524) = 2,085.31 Prob>F = 0.000				F(16, 87524) = 2,046.50 Prob>F = 0.000			
N° obs.: 87,525		R-squared = 67.26%				R-squared = 65.97%			
VIF<2 for all variables		Industry control: Yes				Industry control: Yes			

DISTRESS is a categorical variable taking the value of 0 for firm-year observations in the safe zone, 1 for observations in the grey zone, and 2 for observations in the distressed zone. In our model, the safe zone is omitted in order to test the effect of firms experiencing financial difficulties on their earnings management initiatives. Model 1 is the primary model, while model 2 is a control model. The Variance Inflation Factor (VIF) is less than 2 for all model variables. Variable descriptions and measurement are provided in Table 2. *** = 1% level of significance; **= 5% level of significance; *= 10% level of significance.

firms increasing their external financing are more likely to manage earnings downward (increasing negative discretionary accruals) rather than upward in order to improve reported earnings. The coefficient of *DEBTCH* in Model 2 is negative and significant sign at the 1% level, indicating that managers of firms issuing new debt are likely to engage less in income-increasing earnings management initiatives. This finding is consistent with Campa (2019) and indicates that managers of firms increasing their external funding are likely to manage earnings downward, supporting the control hypothesis (Jensen, 1986). In sum, these two findings indicate that managers of firms issuing new debt are more likely to reduce the magnitude of earnings management (less income-decreasing and income-increasing earnings management) than other firms, confirming the Jensen control hypothesis.

In Model 1, the coefficient of the new equity issue control variable, *EQUTCH* is negative, consistent with expectations, and significant at the 1% level. This finding is consistent with Campa (2019) and indicates that firms increasing equity funding are likely to manage earnings upward. The coefficient of *EQUTCH* in Model 2 is positive and significant at the 1% level, indicating that firms issuing new equity also engage in income-increasing earnings management to meet shareholder earnings expectations.

Robustness tests

Here, we repeat our estimation of Equation 7 using discretionary accruals measured by the Kothari et al. (2005) model as, according to the literature (Cohen and Zarowin, 2010), it has a higher explanatory power compared to both the traditional and modified-Jones models. In fact, following Guay et al. (1996), since discretionary accruals reflect manager discretion in managing accruals in order to impact the reported earnings to meet or beat outsider's forecasts, the Kothari et al. performance model should anticipate future cash flows to produce a more reliable measure of earnings

Table 7. Linear regression model of the determinants of earnings management – First robustness test (discretionary accruals estimated using the Kothari et al. (2005) model).

Variable	Expected sign	Model 3 (main model): Dependent variable *EM3* (negative DA) (obs. 42,778 = 48.88%)				Model 4 (control model): Dependent variable *EM4* (positive DA) (obs. 44,747 = 51.12%))			
		Coeff.	St. err.	p-value	Sig.	Coeff.	St. err.	p-value	Sig.
Test variable									
DISTRESS:									
Grey zone	+	0.005	0.000	0.000	***	-0.001	0.000	0.010	***
Distress zone	+	0.008	0.000	0.036	**	0.005	0.000	0.000	***
Control variable									
LEV	+	0.014	0.001	0.000	***	-0.007	0.001	0.000	***
GROW	+	0.004	0.001	0.000	***	0.008	0.001	0.000	***
ROA	+	-0.010	0.003	0.000	***	-0.016	0.003	0.000	***
SIZE	+	0.001	0.000	0.000	***	-0.001	0.000	0.000	***
TAX	+	0.003	0.000	0.000	***	-0.003	0.000	0.000	***
TACC	-	0.498	0.003	0.000	***	0.475	0.003	0.000	***
DEBTCH	-	0.001	0.000	0.000	***	-0.002	0.000	0.000	***
EQUTCH	-	-0.005	0.001	0.000	***	0.007	0.000	0.000	***
constant		-0.035	0.002	0.000	***	0.063	0.002	0.000	***

Sample firms (balanced):	**Model 3 description:**	**Model 4 description:**
N° firms: 9,725	F(16, 87524) = 1,924.32 Prob>F = 0.000	F(16, 87524) = 1,940.64 Prob>F = 0.000
N° obs.: 87,525	R-squared = 64.67%	R-squared = 63.63%
VIF<2 for all variables	Industry control: Yes	Industry control: Yes

This table shows the first robustness linear regression, using the discretionary abnormal accruals estimated by the Kothari et al. (2005) model as dependent variable. The dependent variable *EM3* indicates discretionary accruals below zero, while the dependent variable *EM4* indicates the discretionary accruals above zero. *DISTRESS* is a categorical variable taking the value of 0 for firm-year observations in the safe zone, 1 for observations in the grey zone, and 2 for observations in the distressed zone. In our model, the safe zone is omitted in order to test the effect of firms experiencing financial difficulties on their earnings management initiatives. Model 1 is the primary model, while model 2 is a control model. The Variance Inflation Factor (VIF) is less than 2 for all model variables. Variable descriptions and measurement are provided in Table 2. *** = 1% level of significance; **= 5% level of significance; *= 10% level of significance.

than cash flows (Watts and Zimmerman, 1986). The findings of this first robustness test are shown in Table 7.

In Table 7, Model 3 reports the findings of the estimation of Equation 7 using the main dependent variable *EM3*, proxying income-decreasing earnings management (positive discretionary accruals are set to zero). Model 4 reports the findings of the estimation of the equation using the control dependent variable *EM4* which proxyies income-increasing earnings management (negative discretionary accruals are set to zero). The R-square of Model 3 is 64.67% which is lower than the R-square of Model 1 in Table 6. The R-square of the control Model 4 is 63.63% which isalso lower than the R-square value of the control Model 2 in Table 6. Contrary to Cohen and Zarowin (2010), the results indicate a lower explanatory power of the Kothari et al. model compared to the modified-Jones model in decomposing total accrual in non-listed firms. The VIF is below 2 for all variables in the equation. The models are run with the Petersen

(2009) methodology, in the same manner as the models in Table 6.

Apart from the differences in explanatory power, we find that the signs of the test categorical variable Z-Score in the Model 7, assuming the values 1 (grey zone) and 2 (distressed zone), are consistent with expectations and the sign of the same variable in the main Model 1. Contrary to the results of the control Model 2, the results of the test variable Z-Score are negative and positive for firms in the grey zone and the distress zone, respectively. These findings suggest that, using the Kothari et al. (2005) model, managers of firms in the grey zone are more likely to manage earnings downward than managers of healthy firms, while managers of firms in the distress zone, consistent with the debt hypothesis, are more likely to manage earnings upward than managers of healthy firms.

The signs of control variables in Models 3 and 4 are consistent with expectations and with those in Models 1

and 2 (Table 6), except for the variable *ROA* in Model 3 which shows a negative and significant sign at the 1% level. This suggests that more profitable firms are likely to reduce negative discretionary accruals in order to demonstrate a better financial situation to the stakeholders.

In the second robustness test, we repeat the estimation of Equation 7 but this time using a reduced firm sample. In Table 2 we observe that 84.35% of firms are manufacturers, wholesalers, retailers, carrier and servicing. and so we focus the analysis on these two most representative industry sectors for the Italian environment. As before, we compute the main dependent variable *EM5* (negative earnings management) and the control dependent variable *EM6* (positive earnings management) by using the modified-Jones model to decompose total accruals. The R-square for Models 5 and 6 are of 65.76% and 64.96%, respectively, values which are similar to those in Table 6 but higher than those in Table 7. These results indicate that the modified-Jones' model is a good proxy of earnings management initiatives in non-listed firms compared to the Kothari et al. model. The VIF is less than 2 for all variables in the models, and they are estimated using the Petersen (2009) methodology in the same way as the models in Table 6.

Even though Equation 7 is estimated on a reduce sample (73,827 firm-year observations), the test and control variables in Models 5 and 6 maintain the same signs as those in Table 6 (Models 1 and 2, respectively), except for where the Z-Score assumes the value of 2 (distress zone). This variable assumes a positive and significant value at the 1% level, indicating that managers of distressed firms are likely to manage earnings upward in order to mask poor financial performance, consistent with the debt hypothesis.

Generally, comparing results of Models 1, 3 and 5 in Tables 6, 7 and 8, respectively, we provide empirical evidence that for the managers of non-listed Italian firms managing discretionary accruals downward, those with distressed firms are more likely to increase negative discretionary accruals than healthy firms. However, for the control models we find mixed results. For firms managing earnings upward (positive discretionary accruals), we find that managers of distressed firms (control Model 2) are more likely to reduce the magnitude of positive discretionary accruals than healthy firms. Further, managers of distressed firms (control Models 4 and 6) are likely to increase positive discretionary accruals more than managers of healthy firms.

Conclusions

This paper aimed to investigate whether firm financial problems, as proxied by the Z-Score measure, impact on income-decreasing earnings management initiatives.

Analyzing a sample of non-listed Italian firms, our empirical evidence suggests that, consistent with expectations, managers of firms experiencing financial difficulties are more likely to manage their earnings downward. Consistent with DeAngelo et al. (1994), this indicates that managers of Italian non-listed firms have less incentive to mask poor financial performance, attempting to renegotiate their debt on better terms and signal to their stakeholders the willingness of managers to address the underlying problems. This suggests that discretionary accruals may be less informative for distressed firms since an income-increasing earnings management strategy could be perceived opportunistically by lenders, that is, as an accounting strategy to mask poor financial performance. Such a strategy may reduce the trust of lenders in assessing borrower crediworthiness, since this may reduce the ability to borrow or lead to a higher risk premium charged on any borrowing.

Concerning the control variables, consistent with expectations and the Jensen (1986) hypothesis, the managers of leveraged firms are likely to engage in income-decreasing earnings management. Growth opportunities and firm profitability are positively associated with both income-increasing and income-decreasing earnings management initiatives. These mixed results may be explained by the way *EM1* (main dependent variable) and *EM2* (control dependent variable) are measured. Firm size, contrary to expectations, is negatively associated with both income-decreasing earnings management (*EM1*) and income-increasing earnings management (*EM2*). Thus, the managers of large firms are likely to smooth their earnings since they meet the zero threshold, probably to reduce political costs (Garrod et al., 2007) arising when a loss or a high net income are recognised. As expected, tax is positively related to income-decreasing earnings management; as tax increases, managers engage in income-decreasing earnings management (*EM1*) in order to reduce taxable income. At the same time, consistent with the political cost hypothesis of Watts and Zimmerman (1978), as discussed in Garrod et al. (2007), tax is negatively associated with income-increasing earnings management initiatives (*EM2*). Thus, firms moderate their income-increasing earnings management initiatives to reduce taxable income. As expected, and consistent with the extant literature (Francis et al., 1999; Mariani et al., 2010; Bisogno, 2012), total accruals drives discretionary accruals (reducing income-decreasing and increasing income-increasing earnings management initiatives, respectively). Finally, the issue of new debt and equity has a mixed impact on *EM1* and *EM2*.

This study robustness tests provide qualitatively similar findings to those of the main models in Table 6. Further, we find evidence of higher explanation power of the modified-Jones model when decomposing total accruals. In addition, the second robustness test shows qualitatively the same findings as those in the main model (using

Table 8. Linear regression model of the determinants of earnings management – Second robustness test (discretionary accruals estimated using the modified Jones model).

Variable	Expected sign	Model 5 (main model): Dependent variable *EM5* (negative DA) (obs. 36,125 = 41.27%)				Model 6 (control model): Dependent variable *EM6* (positive DA) (obs. 51,400 = 58.73%))			
		Coeff.	St. err.	p-value	Sig.	Coeff.	St. err.	p-value	Sig.
Test variable **DISTRESS:**									
Grey zone	+	0.005	0.000	0.000	***	-0.000	0.001	0.207	-
Distress zone	+	0.007	0.000	0.000	***	0.007	0.000	0.000	***
Control variable									
LEV	+	0.015	0.001	0.000	***	-0.010	0.001	0.000	***
GROW	+	0.002	0.001	0.133	-	0.006	0.001	0.000	***
ROA	+	0.003	0.003	0.326	-	-0.005	0.003	0.052	*
SIZE	+	0.001	0.000	0.000	***	-0.001	0.000	0.000	***
TAX	+	0.003	0.000	0.000	***	-0.003	0.000	0.000	***
TACC	-	0.497	0.003	0.000	***	0.472	0.003	0.000	***
DEBTCH	-	0.001	0.000	0.000	***	-0.002	0.000	0.000	***
EQUTCH	-	-0.004	0.000	0.000	***	0.007	0.000	0.000	***
constant		-0.031	0.001	0.000	***	0.056	0.001	0.000	***

Sample firms (balanced):	Model 5 description:	Model 6 description:
N° firms: 8,203	$F_{(16, 87524)} = 2,422.71$ Prob>F = 0.000	$F_{(16, 87524)} = 2,488.32$ Prob>F = 0.000
N° obs.: 73,827	R-squared = 65.76%	R-squared = 64.96%
VIF<2 for all variables	Industry control: Yes	Industry control: Yes

This table shows the second robustness linear regression, using the discretionary abnormal accruals estimated using the modified-Jones model (Dechow et al., 1995) as dependent variable. The dependent variable *EM5* indicates discretionary accruals below zero, while the dependent variable *EM6* indicates discretionary accruals above zero. Our sample includes only those firms belonging to the most representative industry sectors, manufacturing and wholesale firms (n= 8,203 firms; obs. 73,827). *DISTRESS* is a categorical variable taking the value of 0 for firm-year observations in the safe zone, 1 for observations in the grey zone, and 2 for observations in the distressed zone. In our model, the safe zone is omitted in order to test the effect of firms experiencing financial difficulties on their earnings management initiatives. Model 1 is the primary model, while model 2 is a control model. The Variance Inflation Factor (VIF) is less than 2 for all model variables. Variable descriptions and measurement are provided in Table 2. *** = 1% level of significance; **= 5% level of significance; *= 10% level of significance.

signed discretionary accruals as the dependent variable), indicating that for firms showing negative discretionary accruals (income-decreasing earnings management), the managers of distressed firms are more likely to increase the magnitude of these accruals than the managers of healthy firms.

The findings have several implications for academics, professionals and domestic standard setters. First, they suggest that a deterioration in firm financial performance creates managerial incentives to manage earnings downward, within firms showing negative discretionary accruals. However, our robustness tests indicate that for firms showing positive discretionary accruals (suggesting income-increasing earnings management), the managers of distressed firms are likely to reduce the magnitude of these accruals.

Overall, financial distress has a positive impact on income-decreasing and a negative impact on income-

increasing earnings management initiatives suggesting that the managers of more distressed firms are, on average, more likely to be more conservative than other firms. This may help borrowers and other creditors in assessing firm creditworthiness as they need more reliable accounting information. Second, our findings support the usefulness of Altman's Z-Score in a non-listed firm setting for assessing financial distress risk. Third, our findings provide support for the control hypothesis, suggesting that when firms are under the monitoring and scrutiny of stakeholders, managers have a greater incentive to manage earnings downward. This may be explained by managers facing political costs due to the higher monitoring and scrutiny of firms in financial difficulties that in turn may generate a wealth transfer from owners, managers (or both in wholly-owned firms) to third parties (e.g. lenders, tax offices, etc).

This research suffers from a number of limitations.

First, generalization of our findings may be limited due to our focus solely on the Italian non-listed firm context. Second , we we were unable to investigate the earnings management behavior of bankrupt non-listed firms due to the limitations of the Aida Database.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Agrawal K, Chatterjee C (2015). Earnings management and financial distress: Evidence from India. Global Business Review 16(5 suppl):140-154.

Altman E (1983). Corporate Financial Distress: A Complete Guide to Predicting, Avoiding and Dealing with Bankruptcy. New York. Wiley.

Altman EI, Iwanicz-Drozdowska M, Laitinen EK, Suvas A (2017). Financial distress prediction in an international context: A review and empirical analysis of Altman's Z-score model. Journal of International Financial Management and Accounting 28(2):131-171.

Altman E, Hotchkiss E (2006). Predict and avoid bankruptcy, analyze and invest in distressed debt. New Jersey. John Wiley & Sons.

Beaver W, Kettler P Scholes M (1970). The association between market determined and accounting determined risk measures. The Accounting Review 45(4):654-682.

Beneish MD, Vargus ME (2002). Insider trading, earnings quality, and accrual mispricing. The accounting review 77(4):755-791.

Bisogno M, Restaino M, Di Carlo A (2018). Forecasting and preventing bankruptcy: A conceptual review. African Journal of Business Management 12(9):231-242.

Bisogno M, De Luca R (2016). Voluntary Joint Audit and Earnings Quality: Evidence from Italian SMEs. International Journal of Business Research 5(1):1-22.

Bisogno M, De Luca, R (2015). Financial distress and earnings manipulation: Evidence from Italian SMEs. Journal of Accounting and Finance 4(1):42-51.

Bisogno M (2012). Audit quality of Italian industrial non-listed firms: an empirical analysis. International Journal of Business Research and Development 1(1):32-47.

Burgstahler DC, Hail L, Leuz C (2006). The Importance of Reporting Incentives: Earnings Management in European Private and Public Firms. The Accounting Review 81(5):983-1016.

Campa D (2019). Earnings management strategies during financial difficulties: A comparison between listed and unlisted French companies. Research in International Business and Finance 50:457-471.

Charitou A, Lambertides N, Trigeorgis L (2007a). Earnings behavior of financially distressed firms: the role of institutional ownership. Abacus 43(3):271-296.

Charitou A, Lambertides N, Trigeorgis L (2007b). Managerial discretion in distressed firms. The British Accounting Review 39(4):323-346.

Charitou A, Lambertides N, Trigeorgis L (2011). Distress risk, growth and earnings quality. Abacus 47(2):158-181.

Chen KY, Elder RJ, Hsieh YM (2007). Corporate governance and earnings management: The implications of corporate governance best-practice principles for Taiwanese listed companies. Journal of Contemporary Accounting and Economics 3(2):73-105.

Cohen DA, Dey A, Lys TZ (2008). Real and accrual-based earnings management in the pre-and post-Sarbanes-Oxley periods. The Accounting Review 83(3):757-787.

Cohen DA, Zarowin P (2010). Accrual-based and real earnings management activities around seasoned equity offerings. Journal of accounting and Economics 50(1):2-19.

Coppens L, Peek E (2005). An Analysis of Earnings Management by European Private Firms. Journal of International Accounting, Auditing and Taxation 14:1-17.

DeAngelo H, DeAngelo L, Skinner DJ (1994). Accounting choice in troubled companies. Journal of Accounting and Economics 17(1-2):113-143.

DeAngelo LE (1981). Auditor size and audit quality. Journal of Accounting and Economics 3:183-199.

Dechow P, Ge W, Schrand C (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. Journal of Accounting and Economics 50(2-3):344-401.

Dechow P, Sloan RG, Sweeney AP (1995). Detecting earnings management. Accounting Review 70(2):193-225.

DeFond ML, Jiambalvo J (1994). Debt covenant violation and manipulation of accruals. Journal of Accounting and Economics 17(1-2):145-176.

Dichev ID, Skinner DJ (2002). Large-Sample Evidence on the Debt Covenant Hypothesis. Journal of Accounting Research 40(4):1091-1123.

Etemadi H, Dehkordi HF, Amirkhani K (2013). Effect of auditor opinion on discretionary accruals behavior of distressed firms: Empirical evidences from Iran. African Journal of Business Management 7(20):1956-1965.

European Union (EU) (2019). 2019 SBA Fact Sheet, Italy. Available at https://ec.europa.eu/docsroom/documents/38662/attachments/1/translations/en/renditions/native

Fich EM, Slezak SL (2008). Can corporate governance save distressed firms from bankruptcy? An empirical analysis. Review of Quantitative Finance and Accounting 30 (2):225-251.

Francis JR, Maydew EL, Sparks HC (1999). The role of Big 6 auditors in the credible reporting of accruals. Auditing: a Journal of Practice and Theory 18(2):17-34.

Garcia Lara JM, García Osma B, Neophytou E (2009). Earnings quality in ex-post failed firms. Accounting and Business Research 39(2):119-138.

Garrod N, Ratej PS, Valentincic A (2007). Political cost (dis) incentives for earnings management in private firms. Available at: https://ssrn.com/abstract=969678

Gilson SC (1989). Management turnover and financial distress. Journal of Financial Economics 25(2):241-262.

Givoly D, Hayn C (2000). The changing time-series properties of earnings, cash flows and accruals: Has financial reporting become more conservative? Journal of Accounting and Economics 29(3):287-320.

Gorganli J, Vakilifard H (2014). The effect of firm size and growth opportunity on accounting discretion and its relationship with future stock return (management opportunism test). European Online Journal of Natural and Social Sciences 3(3):511-521.

Graham J, Harvey C, Rajgopal S (2005). The economic implications of corporate financial reporting. Journal of Accounting and Economics 40(1-3):3-73.

Guay WR, Kothari, SP, Watts RL (1996). A market-based evaluation of discretionary accrual models. Journal of Accounting Research 34:83-105.

Habib A, Bhuiyan BU, Islam A (2013). Financial distress, earnings management and market pricing of accruals during the global financial crisis. Managerial Finance 39(2):155-180.

Humeedat MM (2018). Earnings Management to Avoid Financial Distress and Improve Profitability: Evidence from Jordan. International Business Research 11(2):222-230.

ISTAT (2018), Italian Statistic Institute, Registro Statistico delle Imprese Attive (Statistic Register of Italian Firms. Available at: http://dati.istat.it/Index.aspx?QueryId=20596

Jaggi B, Lee P (2002). Earnings management response to debt covenant violations and debt restructuring. Journal of Accounting, Auditing and Finance 17(4):295-324.

Jelinek K (2007). The effect of leverage increases on earnings management. The Journal of Business and Economic studies 13(2):24.

Jensen MC (1986). Agency costs of free cash flow, corporate finance, and takeovers. The American Economic Review 76(2):323-329.

Jensen MC, Meckling WH (1976). Theory of the Firm: Managerial Behavior, Agency and Ownership Structure. Journal of Financial Economics 3(4):305-360.

Jha A (2013). Earnings management around debt-covenant violations–An empirical investigation using a large sample of quarterly data. Journal of Accounting, Auditing and Finance 28(4):369-396.

Kothari SP, Leone AJ, Wasley CE (2005). Performance matched discretionary accrual measures. Journal of Accounting and Economics 39(1):163-197.

Lazzem S, Jilani F (2018). The impact of leverage on accrual-based earnings management: The case of listed French firms. Research in International Business and Finance 44:350-358.

Lubawa G, Louangrath P (2016). Using Altman z-score to assess the financial effects of Multiple loans on SMEs. International Journal of Research & Methodology in Social Science 2(1):63-86.

Mafrolla E, D'Amico E (2017). Borrowing capacity and earnings management: An analysis of private loans in private firms. Journal of Accounting and Public Policy 36(4):284-301.

Mariani L, Tettamanzi P, Corno F (2010). External Auditing vs Statutory Committee Auditing: the Italian Evidence. International Journal of Auditing 14:25-40.

Mohammadi F, Amini P (2016). Investigating The Relationship Between Financial Distress and Earnings Management in Corporations of Accepted in Tehran Stock Exchange. International Academic Journal of Accounting and Financial Management 3(6):41-50.

Nagar N, Sen K (2016). Earnings management strategies during financial distress. Indian Institute of Management Ahmedabad. Research and Publication. pp. 1-42.

Nalarreason KM, Sutrisno T, Mardiati E (2019). Impact of leverage and firm size on earnings management in Indonesia. International Journal of Multicultural and Multireligious Understanding 6(1):19-24.

Opler TC, Titman S (1994). Financial distress and corporate performance. The Journal of Finance 49(3):1015-1040.

Panda B, Leepsa NM (2017). Agency theory: Review of theory and evidence on problems and perspectives. Indian Journal of Corporate Governance 10(1):74-95.

Petersen MA (2009). Estimating standard errors in finance panel data sets: Comparing approaches. The Review of Financial Studies 22(1):435-480.

Poli S (2013a). Small-sized companies' earnings management: Evidence from Italy. International Journal of Accounting and Financial Reporting 3(2):93-109.

Poli S (2013b). The Italian unlisted companies' earnings management practices: The impacts of fiscal and financial incentives. Research Journal of Finance and Accounting 4(11):48-60.

Poli S (2015). The links between accounting and tax reporting: The case of the bad debt expense in the Italian context. International Business Research 8(5):93-100.

Ranjbar S, Farsad Amanollahi G (2018). The effect of financial distress on earnings management and unpredicted net earnings in companies listed on Tehran Stock Exchange. Management Science Letters 8(9):933-938.

Rosner RL (2003). Earnings manipulation in failing firms. Contemporary Accounting Research 20(2):361-408.

Shan D, Cao G, Dong H (2013). LGMS-FOA: an improved fruit fly optimization algorithm for solving optimization problems. Mathematical Problems in Engineering 13:1-9.

Skinner DJ, Sloan RG (2002). Earnings surprises, growth expectations, and stock returns or don't let an earnings torpedo sink your portfolio. Review of Accounting Studies 7(2-3):289-312.

Smith M, Kestel JA, Robinson P (2001). Economic recession, corporate distress and income increasing accounting policy choice. Accounting Forum 25(4):334-352.

Subramanyam KR (1996). The pricing of discretionary accruals. Journal of Accounting and Economics 22:249-282.

Sweeney AP (1994). Debt-covenant violations and managers' accounting responses. Journal of Accounting and Economics 17(3):281-308.

Ugrin JC, Mason TW, Emley A (2017). Culture's consequence: The relationship between income-increasing earnings management and IAS/IFRS adoption across cultures. Advances in Accounting 37:140-151.

Van Tendeloo B, Vanstraelen A (2008). Earnings management and audit quality in Europe: Evidence from the private client segment market. European Accounting Review 17(3):447-469.

Watts RL, Zimmerman JL (1978). Towards a positive theory of the determination of accounting standards. Accounting Review 53(1):112-134.

Watts R, Zimmerman J (1986). Positive accounting theory. Englewood Cliffs, New Jersey: Prentice-Hall.

Yang WS, Chun LS, Ramadili SM (2009). The effect of board structure and institutional ownership structure on earnings management. International Journal of Economics and Management 3(2):332-353.

Related Journals:

African Journal of
Marketing Management

Journal of
Accounting and Taxation

Journal of
Economics and International Finance

International Journal of
Peace and Development Studies

International Journal of
Sociology and Anthropology

African Journal of
Business Management

Journal of
Geography and Regional Planning

Journal of
Hospitality Management and Tourism

Journal of
Public Administration and Policy Research

www.academicjournals.org