Open University Cyprus   Hellenic *Open University*

Master's join degree/post graduate Programme
Enterprises Risk Management (ERM)

MASTER THESIS

Risk Management Strategy of Insurance Companies and Global Financial Crisis

A study focusing on insurance companies globally and in Greece

Stergiani Kotsampasi

Supervisor
Dr. Dimitrios Dapontas

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This thesis submitted for partial fulfillment of the requirements
Master's join degree/post graduate programme
«Enterprises Risk Management (ERM)»
Faculty of Economics and Management

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To my son Apostolos, to my husband John, and to my parents Antonia and Tasos.

Summary

Insurance companies are financial organizations that their core businesses are about dealing with their clients' risks, as well as their own risks in a daily basis. Namely, effective risk management is the core business of insurance companies in order to preserve a satisfactory financial performance and be able to survive after risk compensations. Even though the concept of risk management has its' roots in insurance companies, and the reason of existence of insurance companies is undertaking, through insurance contracts, their clients' risks with a risk related premium in exchange, nevertheless, it is very interesting the fact that the global financial crisis revealed that many of those companies had inefficient risk management strategy that led them to bankruptcy.

The goal of this postgraduate dissertation is to examine how the global financial crisis affected insurance companies globally and in Greece, and primarily to examine and to reveal the vulnerabilities of insurance risk management strategies before and during the crisis that led some insurance companies to fail to protect their profitability and their customers' value by going bankrupt. Furthermore, 106 questionnaires were collected from top executives in the risk management sector, in order to be conducted an econometric analysis of the determinants that define the level of effective risk management strategy of insurance companies in Greece. For this purpose, was used the statistical package of social sciences (SPSS) and available space on web server for developing the website questionnaire on Google Forms.

Keywords: insurance risk management, financial crisis, vulnerabilities, effective insurance risk management, determinants, SPSS.

Περίληψη

Οι ασφαλιστικές εταιρείες είναι χρηματοπιστωτικοί οργανισμοί που οι βασικές επιχειρηματικές τους δραστηριότητες αφορούν την διαχείριση των κινδύνων των πελατών τους καθώς και των δικών τους κινδύνων σε καθημερινή βάση. Συγκεκριμένα, η αποτελεσματική διαχείριση των κινδύνων είναι η βασική επιχειρηματική δραστηριότητα των ασφαλιστικών εταιρειών, προκειμένου να διατηρήσουν μια ικανοποιητική χρηματοοικονομική απόδοση και να είναι σε θέση να επιβιώσουν μετά από αποζημιώσεις κίνδυνου. Παρόλο που η έννοια της διαχείρισης κινδύνων έχει τις ρίζες της στις ασφαλιστικές εταιρείες και ο λόγος ύπαρξης των ασφαλιστικών εταιρειών είναι η ανάληψη, μέσω ασφαλιστικών συμβάσεων, των κινδύνων των πελατών τους με αντάλλαγμα ασφάλιστρο αντίστοιχο του αναλαμβανόμενου κινδύνου, ωστόσο, είναι πολύ ενδιαφέρον το γεγονός ότι η παγκόσμια χρηματοπιστωτική κρίση αποκάλυψε ότι πολλές από αυτές τις εταιρείες είχαν αναποτελεσματική στρατηγική διαχείρισης κινδύνων που τους οδήγησε σε πτώχευση.

Σκοπός αυτής της μεταπτυχιακής διπλωματικής εργασίας είναι να εξετάσει πώς η παγκόσμια χρηματοπιστωτική κρίση επηρέασε τις ασφαλιστικές εταιρείες παγκοσμίως και στην Ελλάδα και πρωτίστως να εξετάσει και να αποκαλύψει τις ευπάθειες των στρατηγικών διαχείρισης ασφαλιστικού κινδύνου, πριν και κατά τη διάρκεια της κρίσης, που οδήγησε ορισμένες ασφαλιστικές εταιρείες να αποτύχουν να προστατέψουν την κερδοφορία τους και την αξία των πελατών τους πηγαίνοντας σε πτώχευση. Επιπλέον, συλλέχθηκαν 106 ερωτηματολόγια από κορυφαία στελέχη στον τομέα διαχείρισης κινδύνων, προκειμένου να διεξαχθεί μια οικονομετρική ανάλυση των προσδιοριστικών παραγόντων που καθορίζουν το επίπεδο της αποτελεσματικής στρατηγικής διαχείρισης κινδύνων των ασφαλιστικών εταιρειών στην Ελλάδα. Για το σκοπό αυτό, χρησιμοποιήθηκε το στατιστικό πακέτο κοινωνικών επιστημών (SPSS) και διαθέσιμος χώρος σε web server για την ανάπτυξη της ιστοσελίδας του ερωτηματολογίου στις φόρμες Google.

Λέξεις κλειδιά: διαχείριση ασφαλιστικού κινδύνου, χρηματοπιστωτική κρίση, ευπάθειες, αποτελεσματική διαχείριση ασφαλιστικού κινδύνου, προσδιοριστικοί παράγοντες, SPSS.

Acknowledgements

Table of contents

Introduction

It is a fact that the financial crisis has had an obvious impact on insurance companies, mostly through their investment portfolios. Additionally, exposures to market and credit risks have been unveiled, including in financial security insurance companies and financial groups that are insurance prevailed as well. While insurance companies haven't actually reinforced the downward pressures, it is clear that some of them have added to pressures downwards. It is not surprising the fact that many insurance organizations have been affected by the financial crisis since at the heart of difficulties were the financial instruments that served insurance functions (Schich, 2009).

Valuation and rating pressures had a very significant impact in the case of insurance enterprises especially those that were involved with investment banks. The repercussions caused by these pressures amplified the downward pressures in financial markets during the crisis. The financial security insurance sector provided a notorious example, where the downgrading of the different entities that operated through this sector caused multiple downward pressures on valuations of the securities that were enwrapped by these entities and also were part of the portfolios of other financial organizations (Ibid.).

The above can easily be understood through the example of AIG (American International Group) which was considered as the biggest insurance company in the world. Indeed, it was an extremely complex financial group that was consisted of 70 insurance companies based in US, and of another 170 financial service companies. The company had a wide role in financial markets and had created complex interconnections mostly through lending securities and credit default swaps. That is the reason that AIG was important systemically, because was significant counterparty to banks that were systemically important. The company's complex structure prevented the relevant stakeholders to perceive the risks that had to be dealt with.

The AIG's example could help somebody to understand the problems that arise in complex financial organizations when some parties pursue activities that are different, with risk profiles that are different as well. Also some parts in these complex organizations could benefit from increased capital through members of the organization that are less risky (Schich, 2009).

The AIG case and many other cases of insurance companies that collapsed, have highlighted the solution of effective risk management as a very important function of any business in order to sustain during crises. Insurance companies, that are the leaders in dealing with risks, must understand their vulnerabilities and subsequently should evolve their risk management strategy (factors, techniques and tools of success), in order to be effective, and as such, to ensure their viability.

An effective insurance risk management strategy which in all kind of enterprises should include the theoretical steps of establishing the context, identifying risks, analyzing, assessing, evaluating, treating, monitoring and communicating risks, could bring many benefits to an insurance company. Some of these benefits include improvement in decision making, effective allocation of resources by reducing costly and unexpected activities, improvement in communication and information providing to senior management and stakeholders, and also improvement of financial performance (Kokobe & Gemechu, 2016).

The goal of this dissertation is to examine how the global financial crisis affected insurance companies globally and in Greece, and primarily to examine and to reveal the vulnerabilities of insurance risk management strategies before and during the crisis that led some insurance companies to fail to protect their profitability and their customers' value by going bankrupt. Subsequently, the most significant factors that define an effective insurance risk management strategy will be highlighted, and an econometric analysis of the determinants that define the level of effective risk management strategy of insurance companies in Greece will be conducted.

Thesis Structure

The postgraduate dissertation consists of eight chapters. At the first chapter, a risk management overview is given (definition, theoretical framework). At the second chapter, it is examined how the financial crisis affected the world insurance industry, while the third chapter examines the consequences in the Greek insurance industry. At the fourth chapter, there is description of insurance risk management tools, practices and techniques before, during and after the financial crisis. The fifth chapter examines the improvements that can be made and the factors that define an effective insurance risk management strategy. At the sixth chapter, the research methodology is presented, and at the seventh chapter there is the detailed presentation of the empirical findings in accordance with the corresponding bibliography. Description of conclusions and suggestions are given at the eighth chapter. The appendix has two parts: at the first, there are additional statistical data from Google forms, and at the second, there is the questionnaire form that was used for the collection of answers of the insurance risk executives. Lastly, there are the references to articles, books and electronic sources.

Chapter 1

Risk Management Overview

This chapter refers to the theoretical context of risk management encompassing the basics of risk management, definitions and the general framework and procedures.

1.1 Definition and Nature of Risks

One of the many definitions of risk is that risk is "the effect of uncertainty on objectives" according to the ISO 31000 guide 73. The effect of uncertainty could be negative, positive or an aberration from the anticipated result, while risk is described by a consequence, an event or a variation in occasions. The objectives, even when they are fully understood and stated, they have to be challenged and the requirements on which they are based should be tested through the process of risk management.

Risks that are correlated with the daily operations and routine of an organization are called operational risks, while tactical risks are those that are related with the organization's intentions regarding achievement of change. Product developments, mergers, all kinds of projects and acquisitions are typical examples of tactical risks. Additionally, there are the risks that are connected with the strategic planning of an organization and its' long-term goals, whose time horizon ranges from three, five to more years (AIRMIC, et al., 2009).

Therefore, insurance companies can be affected by risks in the short, medium and long term, and the fact that their core business is about dealing with their clients and their own risks in a

daily basis, is the distinctive element that makes effective risk management imperative, in order to avoid collapse (Kokobe & Gemechu, 2016).

1.2 Effective Risk Management

The effective risk management is desired by all businesses. The strategic management of any business, has or should have risk management as its' central part. Risk management is the procedure where companies address the risks that are related with their operations. In order to be successful, risk management should be commensurate to the addressed risks by the business. Furthermore, risk management should be aligned with other business operations, comprehensive regarding its objectives, embedded into daily operations and dynamic and responsive to change (AIRMIC, et al., 2009).

Risk management focuses on the assessment of important risks and the accomplishment of proper responses to risks. The purpose is to achieve upmost sustainable value from all the operations of the organization. Risk management boosts the understanding of the contingent upside and downside of the variables that can have an impact on an organization. It enhances the possibility of achievement and lessens the possibility of failure and the degree of uncertainty connected with achieving the organization's objectives (Ibid.).

1.2.1 The Risk Management General Framework and Risk Management Process

A general framework for the implementation of risk management is provided in figure 1. Mandate and commitment from the organization, in terms of developing a risk aware culture, is prerequisite for the existence of a risk management framework. Components that are necessary for the development of that risk culture, are the suitable risk architecture (roles, responsibilities, reporting structure), the protocols (risk guidelines, rules, procedures, techniques and tools) and the organizational policy (philosophy, strategy, attitudes and risk appetite). After implementing risk management, follows the feedback stage (monitor and review framework) in order the necessary improvements to be made (AIRMIC, et al., 2009).
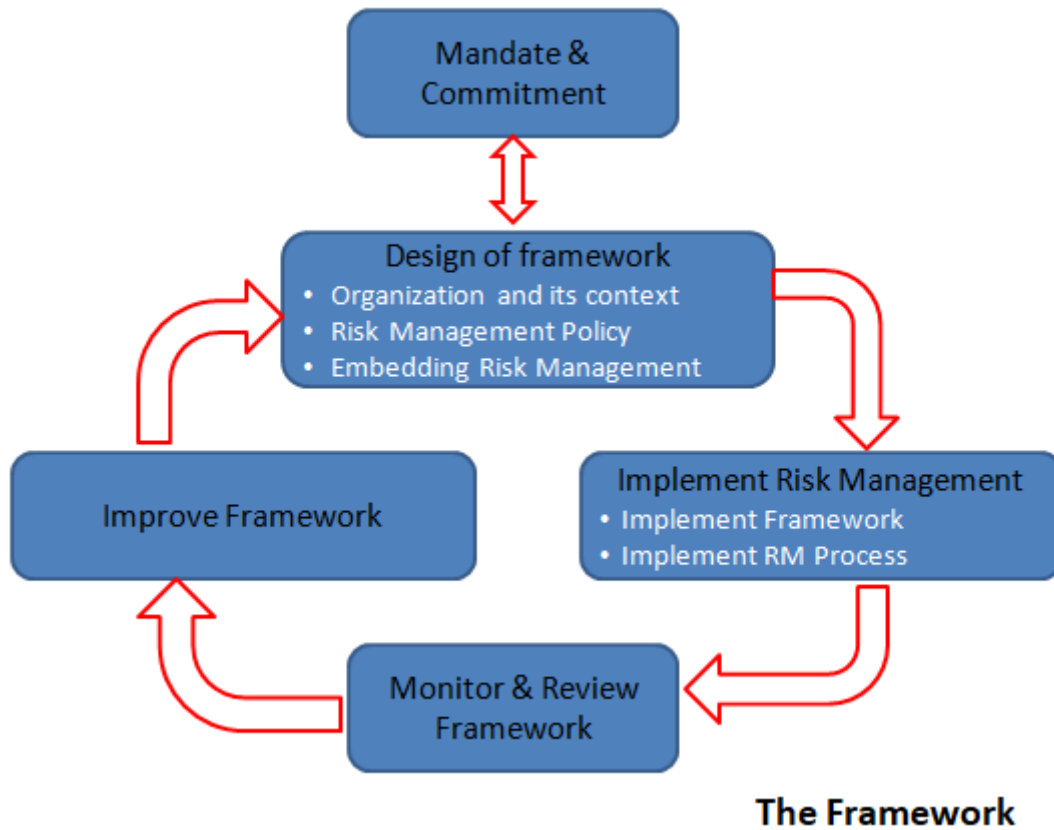
Figure 1: The ISO 31000 risk management framework (source: modified from AIRMIC, ALARM, & IRM, 2009, p. 8)

More analytically, the risk management process is illustrated in figure 2 where the risk assessment includes risk identification, risk analysis and risk evaluation. On the other hand, risk treatment is one of the other key stages of the process that comes after the assessment, and involves tolerance of the risk, risk treatment, transfer and risk termination (AIRMIC, et al., 2009).

- Communication and consultation

Communication and consultation seek to spot who should be implicated in the assessment of risk, including identification, analysis and evaluation and who will deal with the treatment, monitoring and reviewing of risk. Those people should realize the foundation of decision-making and the reason that specific actions have to be taken (Zealand, 2004).
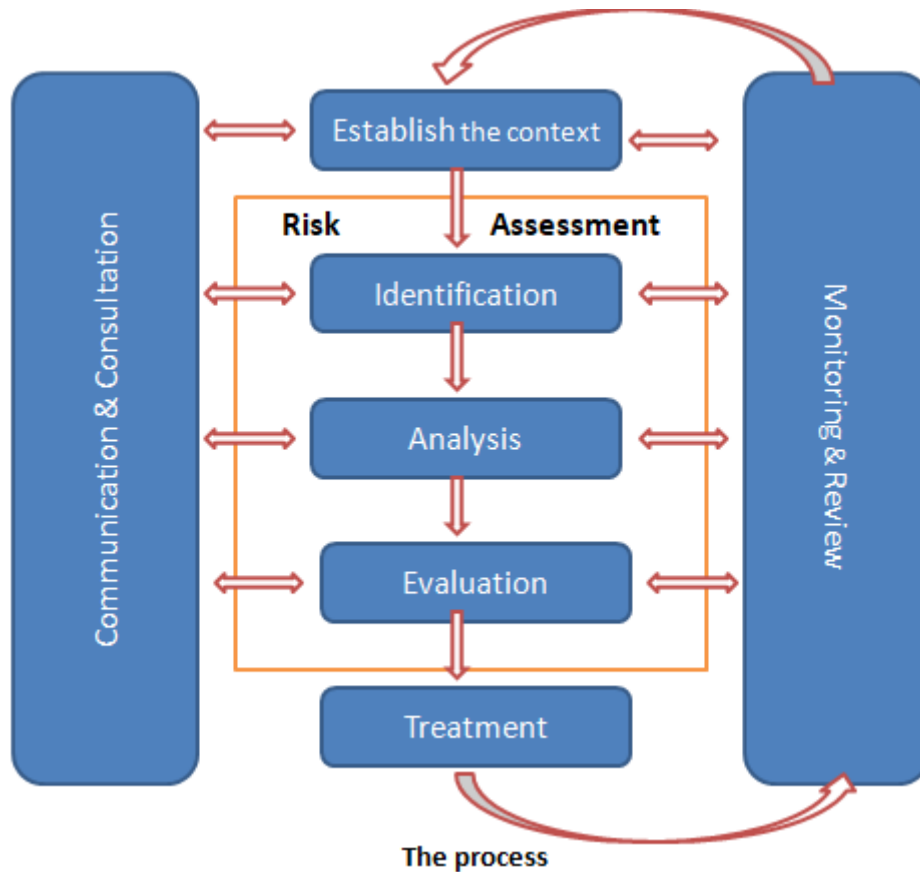
Figure 2: The ISO 31000:2009 risk management process (source: modified from AIRMIC, ALARM, & IRM, 2009, p. 9)

- Establish the context

By establishing the context, the business identifies the factors to be taken into consideration when managing risk, and sets the criteria of risks and the purpose of the remaining process. Namely, the identification of the internal and external environment of the organization (internal and external context), in which the company aims to achieve its goals, is one of the components of the establishing context procedure. Another component is the definition of the risk management context, which involves the objectives, the parameters and the parts of the business where the risk management process is applied or should be applied (Zealand, 2004).

- Risk identification

Risk identification verifies the exposure of the company to uncertainty and risk. This demands an inward knowledge of the enterprise, the market in which it conducts business, the social, the political, the legal and cultural environment in which it operates, and also an

understanding of the strategic and operational goals. This will include understanding of the factors that determine success and the threats and market opportunities. It is necessary to be approached in a systematic way to make sure that all value-adding operations within the enterprise have been estimated and all the risks emerging from these operations defined (AIRMIC, et al., 2009).

- Risk analysis

The outcome of the risk analysis (impact of the risk event and probability of happening) can be used to create a risk profile that provides a rating of importance to each risk and gives a mean for prioritizing risk treatment actions. This ranks the comparative importance of each acknowledged risk. This procedure allows the risks to be located to the business part affected, depicts the primary control methods in place and points out where investments in controls should be increased, reduced or reapportioned. Risk analysis supports the effectiveness of organization's operations by recognizing those risks that need attention by management (Ibid.).

- Risk evaluation

Before calculating the probability, definition of risk tolerance should take place. Each business determines its "risk appetite", namely the level of risk that they are eager to take. Risk evaluation is significant for making sense in certain situations and offers adequate information for decision making regarding tolerance or treatment of risks (Vrijling, et al., 1995).

- Risk treatment

Risk treatment according to ISO 31000 is the activity of choosing and implementing the suitable control measures to curb the risk. Risk treatment involves as its major component, risk control/mitigation, but also involves risk transfer, risk avoidance, risk financing, etc. The role of risk treatment is to provide efficient inside controls. Effectiveness of inside control is the level to which the risk will either be terminated or decreased by the proposed control mechanisms. The cost effectiveness of inside control is related to the cost of putting into action the control, in comparison with the benefits related to the risk reduction (AIRMIC, et al., 2009).

Risk assessment is a vitally significant component of the risk management process. In order to succeed a comprehensive risk management strategy, an organization needs to carry out proper

and efficient risk assessments. Some of the most important risk assessment techniques are workshops and brainstorming, audits and inspections, checklists and questionnaires, dependency analysis and flowcharts, FMEA (Failure Modes Effects Analysis), HAZOP (Hazard and Operability studies), PESTLE (Political, Economic, Social, Technological, Legal, Environmental analyses) and SWOT (Strengths, Weaknesses, Opportunities, Threats) analyses (Ibid.).

- Monitoring and review

Monitoring and review is a vital and integral gear in the risk management process. One example is that monitoring ensures that risk priorities cope with the changing environment. Also, monitoring makes sure that the risk management process is efficient both in theoretical plan and in operation (Zealand, 2004).

1.2.2 Effective Insurance Risk Management

Regarding the insurance industry, and since the great financial crisis of 2008 highlighted the importance of an effective risk management strategy for the companies' sustainability, solvency II is a regulatory driver that came to emphasize the necessity of the effective insurance risk capability.

In order insurance assessments to be effective and comply with the Solvency II requirements for effective risk management frameworks (figure 3), there are some issues that need to be addressed:

At first, effectiveness of insurance assessments depends on the degree to which the different components of an Enterprise Risk Management (ERM) framework, are performed and designed to make better the transparency, the confidence, the decision making and control (Ernst & Young, 2011).

Secondly, the framework becomes more effective, the more effective or of higher degree the skills, value and motivation of individuals (who operate the framework) are, so as to be ensured the efficient risk taking, the influence, the challenge and the change (Ibid.).

9

Risk management can be improved by the degree of embeddedness of the above in operations of insurance companies, by supporting stronger decision making, better training for future uncertainty, robust business performance and enhanced risk adjusted return (Ernst & Young, 2011).
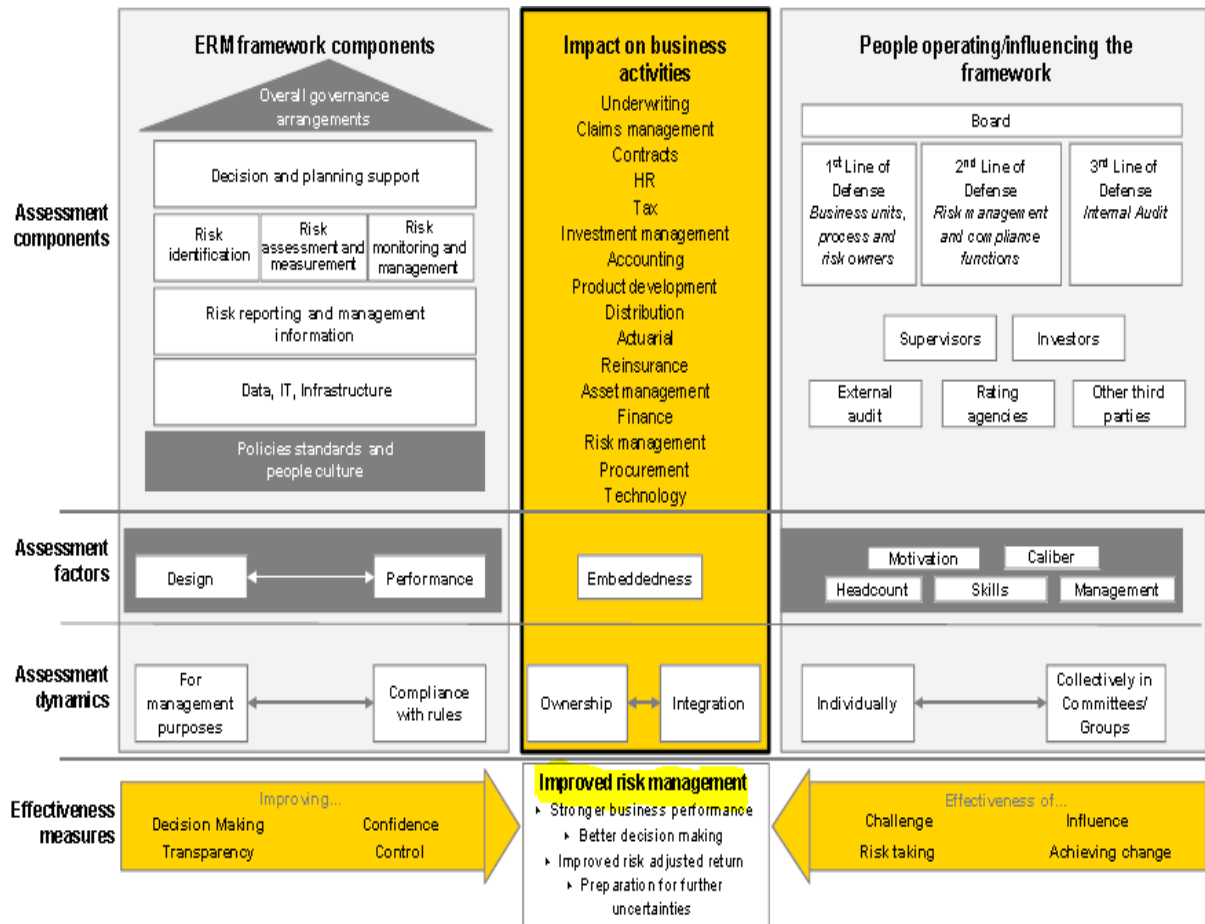
Figure 3: Effectiveness of insurance risk management (source: Ernst & Young, 2011. *Measuring up Effective Risk Management in Insurance Companies,* **s.l.: EY GM Limited, p.2)**

It is interesting the fact that while Solvency II calls for risk management frameworks to be efficient, many Solvency II readiness plans are only actually dealing with the design and accomplishment of components and so, many insurers are not yet preparing to assess or guarantee effectiveness as part of their readiness plans (Ernst & Young, 2011).

Compliance with Solvency II requirements regarding risk management is a significant step towards viability of insurance companies, since this driver came up as a general insurance response to the financial crisis' negative impact on insurance businesses.

Chapter **2**

Impact of the Financial Crisis on the World Insurance Industry

The financial crisis launched by the US and quickly spread to Europe and the rest of the world has led to a sharp decline in prices real estate in the US. With regard to the causes, it should be mentioned that before the crisis, had a period of rapid credit expansion and low borrowing rates. Also during the same period, was observed the use of financial products whose composition was characterized by opacity and poor evaluation, while it also contributed to the fact that banks grew in size and interdependence (Association of Insurance Companies of Greece, 2011).

The crisis has adversely affected asset prices and credit expansion mainly in countries with developed financial sectors services, construction and export activities.

After the crisis, recession, unemployment and liquidity problems arose, resulting in many insurance companies to face serious problems and some of them to fail (diagram 1) (Ibid.).
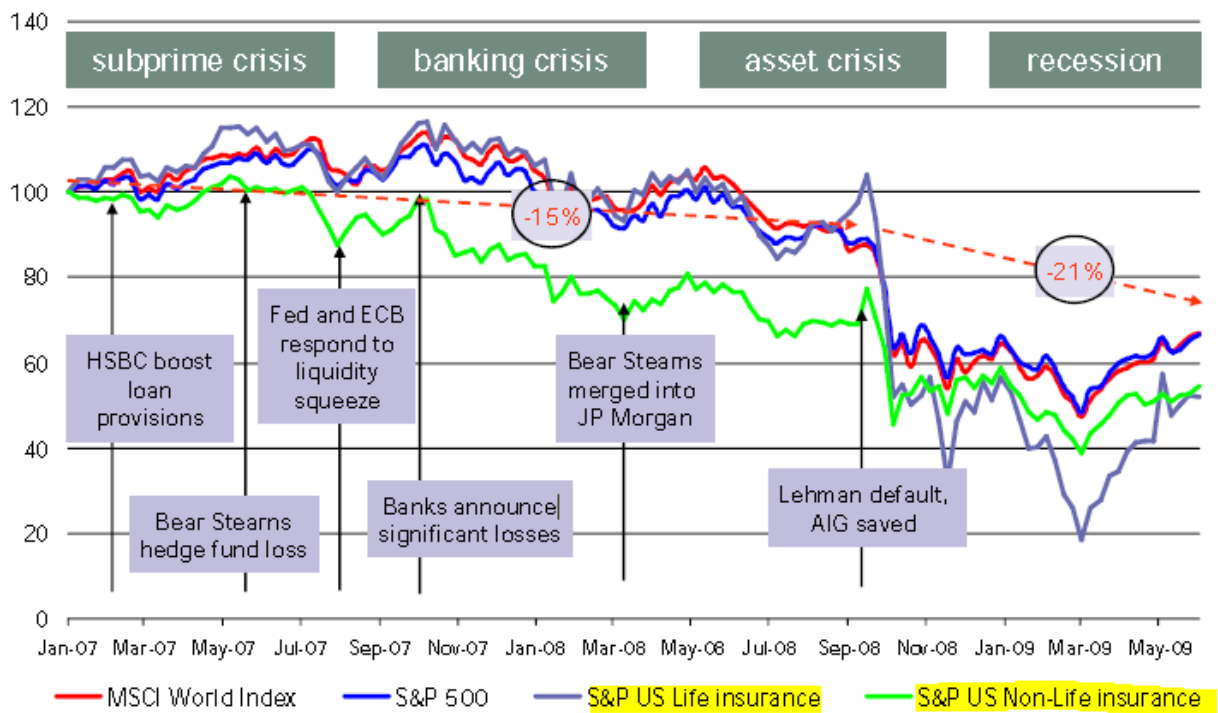
Diagram 1: Equity indices (source: Swiss Re, 2010. *Global Financial Crisis and the Impact on the Insurance Industry,* **Mumbai, India: Swiss Re, p. 8)**

Furthermore, due to declining demand for unit-linked products as the main reason, the premium income in life insurance decreased in 2008-2009 (diagram 2), and globally, life insurers stated sharp falls in solvency and capital (diagram 3) (Swiss Re, 2010).
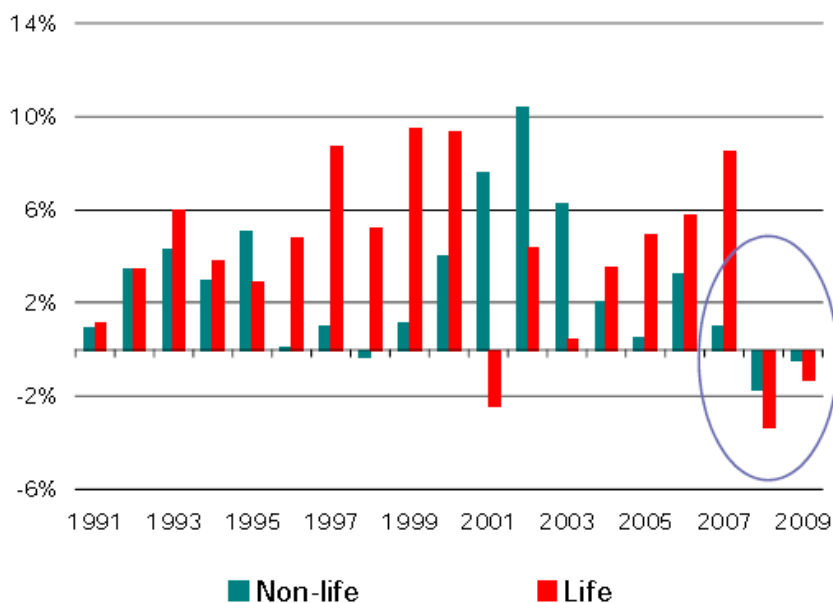
Diagram 2: Global non-life and life real premium growth (source: Swiss Re, 2010. *Global Financial Crisis and the Impact on the Insurance Industry,* **Mumbai, India: Swiss Re, p. 9)**
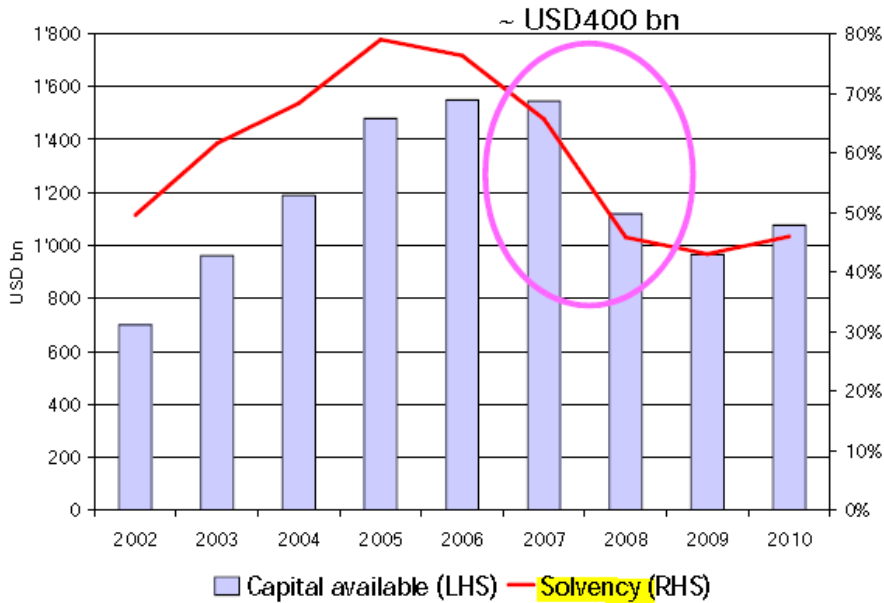
Diagram 3: Sharp declining of solvency in life insurance (source: Swiss Re, 2010. *Global Financial Crisis and the Impact on the Insurance Industry,* **Mumbai, India: Swiss Re, p. 10)**

On the other hand, in non-life insurance, profitability was higher due to better investment results (diagram 4).
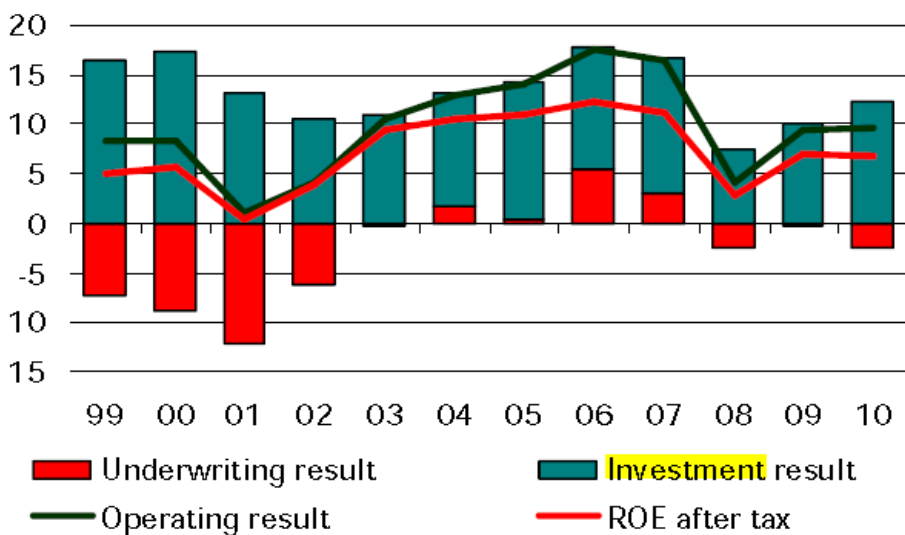
Diagram 4: Non-life market performance (source: Swiss Re, 2010. *Global Financial Crisis and the Impact on the Insurance Industry,* **Mumbai, India: Swiss Re, p. 11)**

As long as it takes the contortions in total reinsurance capital, the investment losses were caused by the losses from bonds or credits of financial institutions and variation in the interest rate of fixed-income securities. Some reinsurers experienced loss that came from the bonds indexed to mortgage market and from the tools such as non-market credit default trades. Moreover, one other party with other European businesses effected from the declines in stock exchange because of the equity of their portfolio (SCHMIDT, 2008).

Regarding the impact of financial crisis in the European insurance market, it was noticed that premium sharply decreased in 2008 and that it was stabilized in 2009. Life insurance premiums were declined in 2008 while Non-life premium declined in 2009. Particularly, motor insurance premium reduced for two consecutive years, 2008 and 2009. In Life insurance, Premium per capita of 2008 went back to 2005 level while the analogous value in Non-life didn't changed significantly (diagram 5) (Association of Insurance Companies of Greece, 2011).

Diagram 5: EU-27, premium per capita (source: Association of Insurance Companies of Greece , 2011. *Economic Crisis and Recession: the Impact on Insurance Companies,* Athens: Association of Insurance Companies of Greece, p. 30)

More specifically, the largest segment of non-life insurance, car insurance was also affected and decreased by 3.8%. The car industry has experienced a decline to € 114 billion in 2009

from € 121 billion in 2007 (diagram 6). At constant exchange rate, this decrease corresponds to an annual decrease of its order3.1%. This trend reflects the combined effect of intense market competition and the impact of the economic downturn. According to the European Union Automobile Manufacturers, new rankings fell by 6% in 2009, after a decrease of 8% in 2008 and a 2% increase in 2007. The largest reductions were found in Spain, Poland and Portugal (Association of Insurance Companies of Greece, 2011).
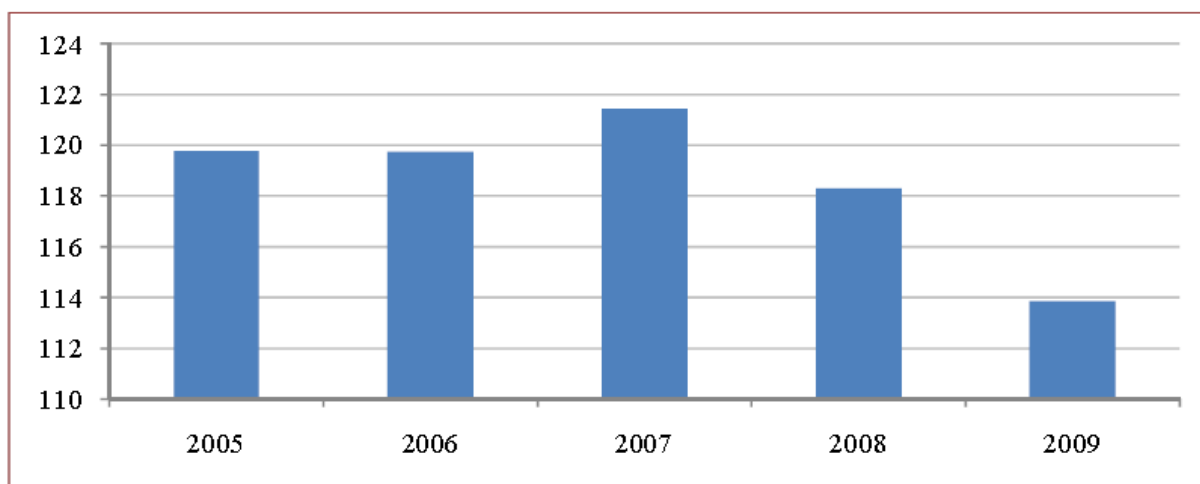
Diagram 6: EU-27, production in car premiums in billions (euros) (source: Association of Insurance Companies of Greece , 2011. *Economic Crisis and Recession: the Impact on Insurance Companies,* **Athens: Association of Insurance Companies of Greece, p. 15)**

In particular, for life, economic growth has benefited life insurance Results up to 2007. The slowdown in growth of GDP in 2008 (1.2% increase in 2008 compared to 5.8% increase in 2007) led to great industry fall. Thus, while per capita production of life was € 1,479 in 2007 decreased to € 1,225 in 2008 (diagram 5).

Non-life insurance has seen an increase in production since 2005 (€ 718 average per capita premium) by 2007 (€ 790) followed by small ones size reductions in 2008 and 2009 (€ 776) (diagram 5) (Ibid.).

In line with the previous indicators, in the EU-27, the proportion of output premiums to GDP was 8.7% in 2005 and rose to 9.1% in 2007. However, dropped to 8.0% in 2008. As the loss

insurance premium ratio remained relatively stable from 2005 to 2009, between 3.1 and 3.3%, with the exception of the slight increase seen from 2005 to 2006, the cause of the changes was in the life sector (diagram 6) (Association of Insurance Companies of Greece, 2011).

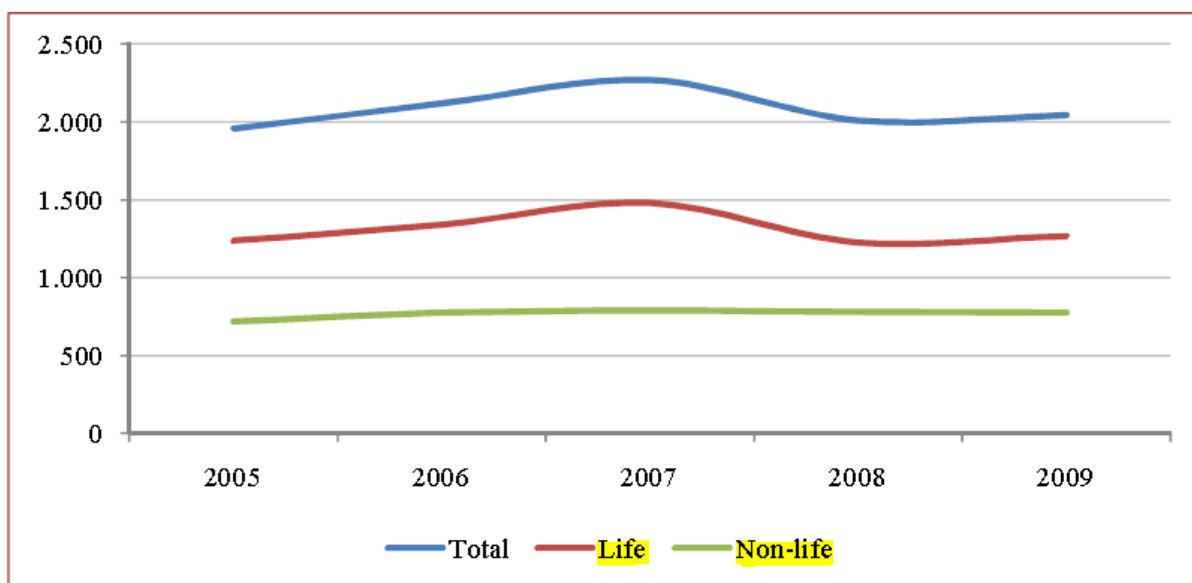**Diagram 7: Production of premiums to GDP (source: Association of Insurance Companies of Greece , 2011.** *Economic Crisis and Recession: the Impact on Insurance Companies,* **Athens: Association of Insurance Companies of Greece, p. 15)**

Chapter 3

Impact of the Financial Crisis on the Greek Insurance Industry

The financial crisis and the economic recession that followed had negative effects on money and capital markets. Some markets have been proven more sensitive to negative stimuli as a result of different levels of exposure to business risks. From this point of view it is interesting to examine the correlation of the economic downturn which followed the financial crisis, with the work of the Private Insurance industry (Association of Insurance Companies of Greece, 2011).

Via monitoring the evolution of production insurance premiums, it is unveiled that Life insurance which rapidly grew before 2007 (17,5% in 2006 and 8,3% in 2007) has been proven more sensitive with a small decline in production in 2008 (1%) and stabilization in 2009 (0,5%) (diagram 8) (Ibid.).
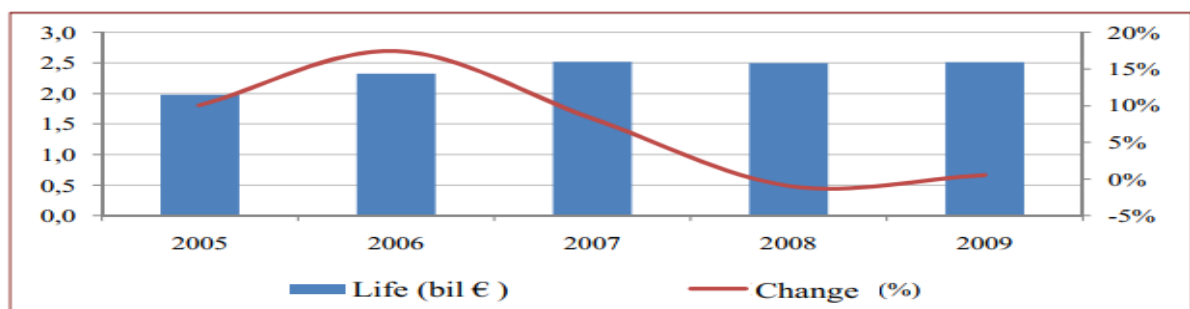
Diagram 8: Production of Life Insurance (source: AICG , 2011,p. 20)

On the contrary, Non-life insurance continued growing at a pace of 4-8% without being influenced by the environment (diagram 9), while paid claims recorded small increases over the next two years particularly because of the motor insurance premium growth (diagram 10) (Association of Insurance Companies of Greece, 2011).

Diagram 9: Production of Non-life Insurance (source: Association of Insurance Companies of Greece , 2011. *Economic Crisis and Recession: the Impact on Insurance Companies,* Athens: Association of Insurance Companies of Greece, p. 20)
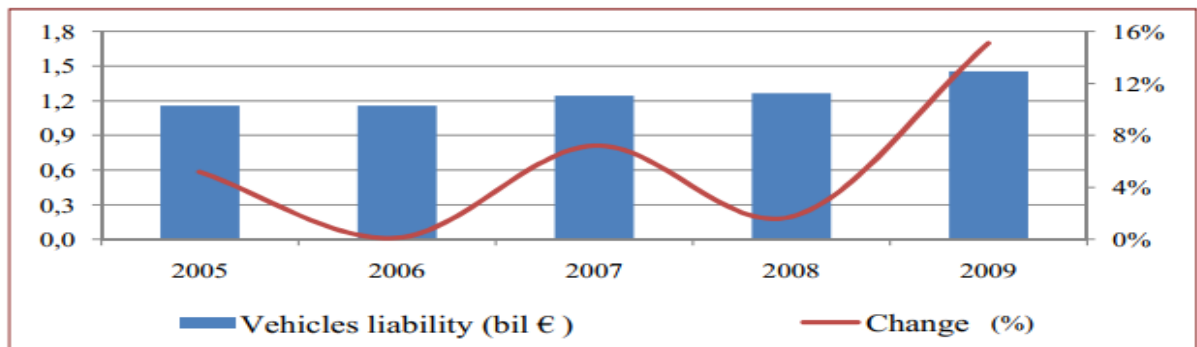
Diagram 10: Vehicles Liability (source: Association of Insurance Companies of Greece , 2011. *Economic Crisis and Recession: the Impact on Insurance Companies,* Athens: Association of Insurance Companies of Greece, p. 21)

At the same time, there was a considerable decline to the most important financial figures of insurance companies, such as Assets, Equity and Profit (before taxes). Specifically over the years from 2005 up to 2009, with the exception of 2008, significant increases have been observed in the total Assets of Insurance companies (diagram 11) (Ibid.).
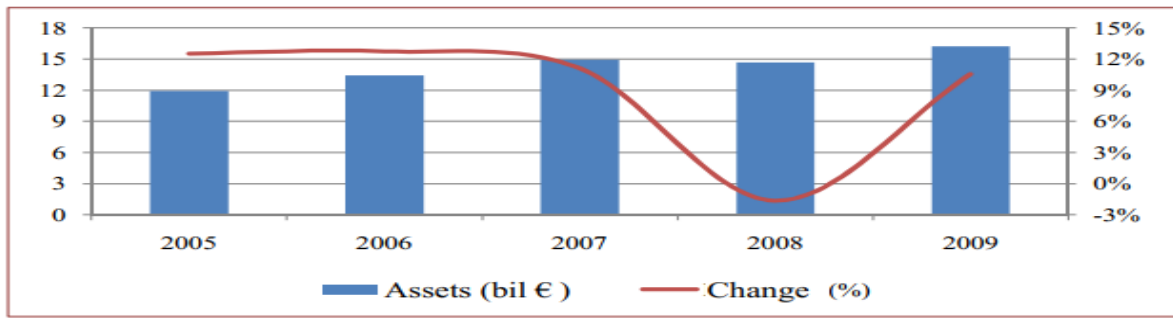
Diagram 11: Assets (source: Association of Insurance Companies of Greece , 2011. *Economic Crisis and Recession: the Impact on Insurance Companies,* **Athens: Association of Insurance Companies of Greece, p. 24)**

Instead, Equity has been highly volatile. While up to 2007 were increased or remained stable, in 2008 they experienced a significant decrease which was partly offset by the increase in 2009 (diagram 12) (Association of Insurance Companies of Greece, 2011).
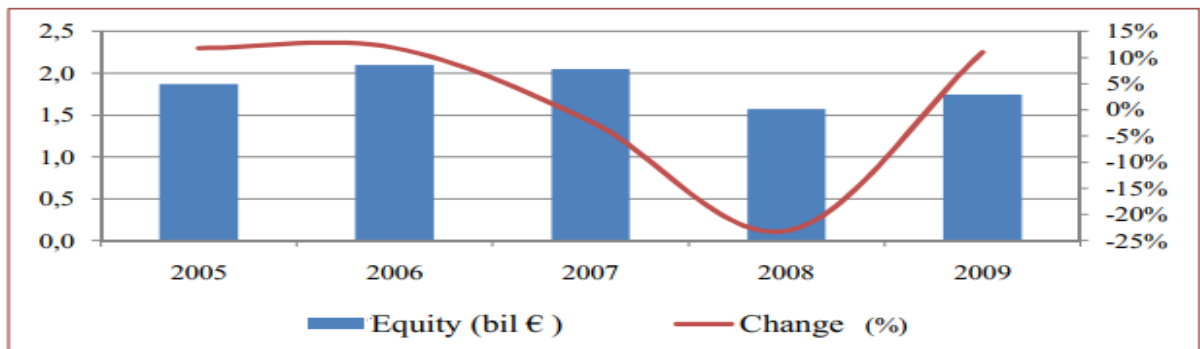
Diagram 12: Equity (source: Association of Insurance Companies of Greece , 2011. *Economic Crisis and Recession: the Impact on Insurance Companies,* **Athens: Association of Insurance Companies of Greece, p. 24)**

Profits (before taxes) of insurance companies revealed a high correlation with the dynamics of the economic environment. The years that preceded the financial crisis, insurance firms recorded total profits of more than 100 million € per year, but in 2008, insurance companies recorded total losses (before taxes) of 492 million €. Subsequently in 2009, they returned to profitability (diagram 13) (Ibid.).
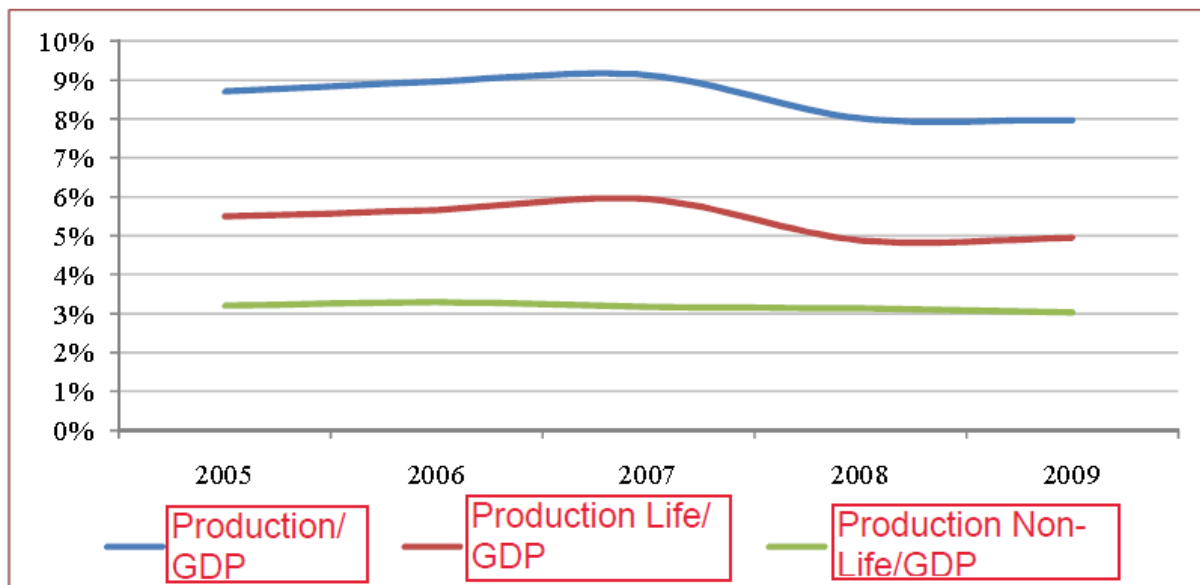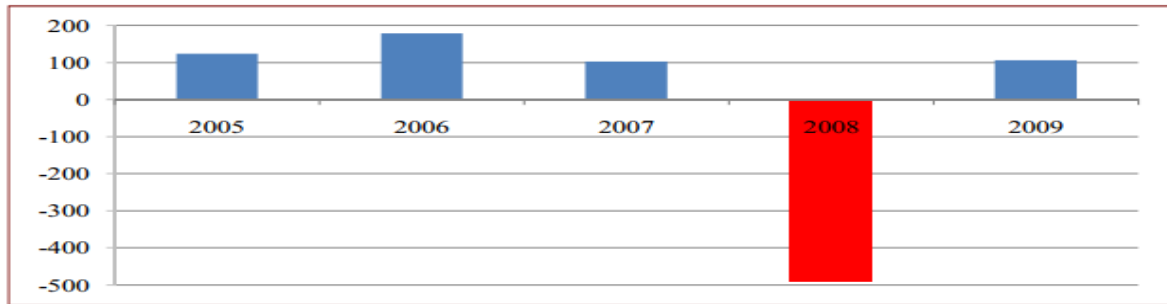
Diagram 13: Profits (before taxes) (source: Association of Insurance Companies of Greece , 2011. *Economic Crisis and Recession: the Impact on Insurance Companies,* Athens: Association of Insurance Companies of Greece, p. 25)

Similar behavior it is also recorded by the depiction of the most important insurance indicators such as insurance penetration, performance and efficiency, with a sharp downturn in 2008 and a rebound in 2009, but to levels below the pre-crisis period.

More specifically the insurance penetration, meaning the proportion of premiums to the Gross Domestic Product (GDP), had a slightly upward trend from 2.2% of GDP 2005 to 2.3% in 2009. There was a slight decline in 2008, with a parallel retreating slightly below 2.2% of GDP (diagram 14) (Association of Insurance Companies of Greece, 2011).
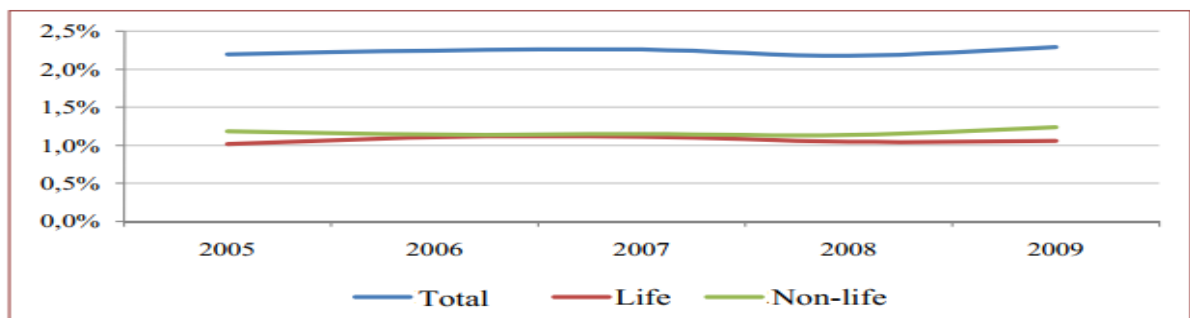
Diagram 14: Insurance Penetration (source: Association of Insurance Companies of Greece , 2011. *Economic Crisis and Recession: the Impact on Insurance Companies,* Athens: Association of Insurance Companies of Greece, p. 26)

Overall, in 2009 the returns of insurance companies came back to around before 2008 levels. Prior to 2008, the Return on Assets (RoA) was close to 1% and after falling to -3.5% in 2008,

it returned to 0.7% in 2009. Likewise, the Return of Equity (RoE) was positive prior to 2008, and in fact it had reached 8,5% in 2006. But during 2008 it fell to 31,3% but returned to 6,1% in 2009 (diagram 15) (Ibid.).
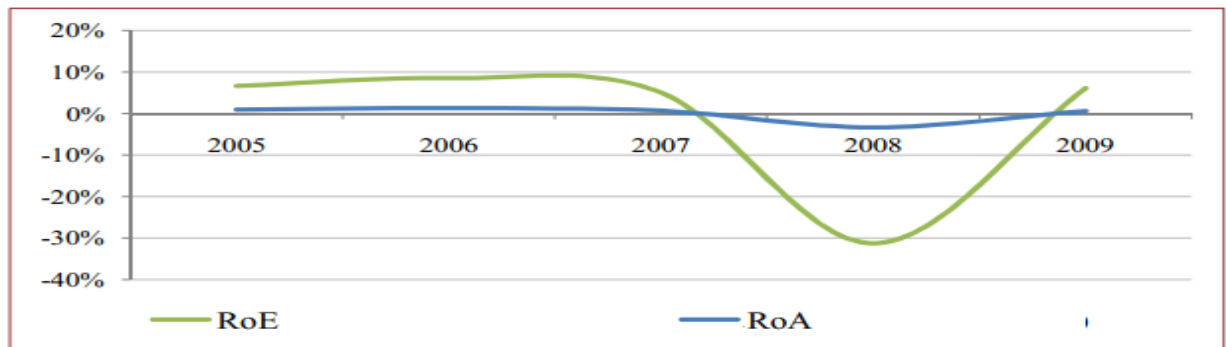
Diagram 15: RoE and RoA (source: Association of Insurance Companies of Greece , 2011. *Economic Crisis and Recession: the Impact on Insurance Companies,* Athens: Association of Insurance Companies of Greece, p. 27)

In the years 2005 to 2007, insurance companies operated by enjoying a profit margin (before taxes) ranging from 2% to 4%. In 2008, this size was negative and reached -9.4%, while in 2009 insurance companies managed to restore the size to a positive price (1.9%), but to a lower level than in previous year (diagram 16) (Association of Insurance Companies of Greece, 2011).
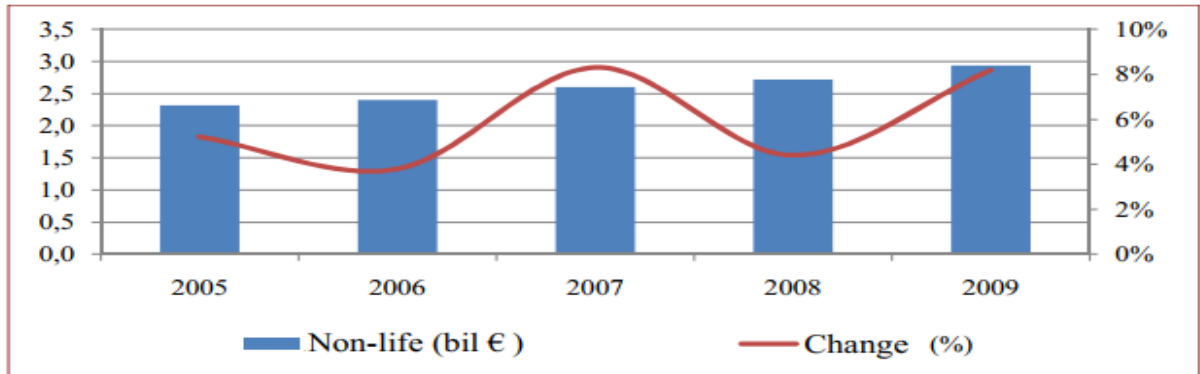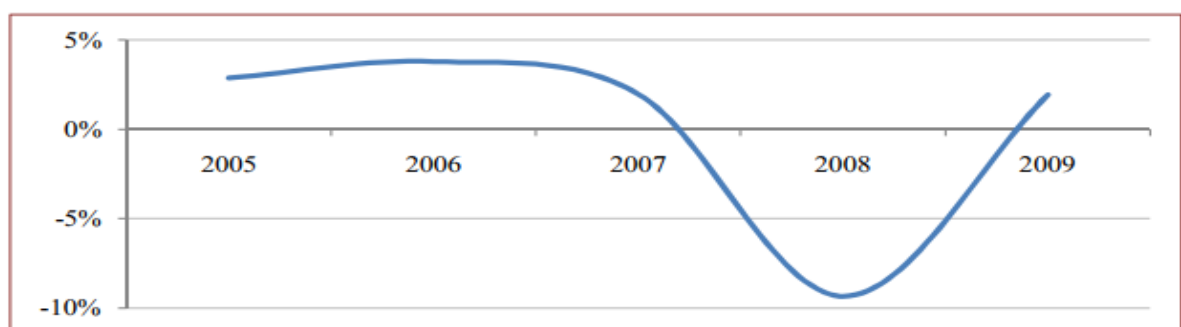

Diagram 16: Profit Margin (source: Association of Insurance Companies of Greece , 2011. *Economic Crisis and Recession: the Impact on Insurance Companies,* Athens: Association of Insurance Companies of Greece, p. 27)

Consequently it can be said that practically as long as the rates of change in GDP remain negative (recessionary phase), the growth rates of the insurance market will remain low or even negative. It is obvious that premium production has followed the annual GDP cycle with a two-quarter delay time in the rise and a quarter in the fall (Ibid.). Finally it should be stated that the positive chart slope of the trend line of the evolution of premium production suggests that when the economy rebounds, then it is likely to push the insurance market to growth rates such as those observed between the first quarter of 2007 and the third quarter of 2008.

Chapter 4

Insurance Risk Management Tools, Practices and Techniques Before, During and After the Financial Crisis

This chapter provides a short overview of the insurance risk management tools, practices and techniques that are in use and focuses on how a risk manager should be prepared; before, during and after a financial crisis.

4.1 Insurance Risk Management Tools, Practices and Techniques

The 21st century has seen great efforts to risk management. Insurers should measure the various types of risks they are exposed to and create ways of effectively managing them. They should also accept and manage at firm level, only those risks that are uniquely a part of their services, thus reducing their risk exposure. Risk management is a practicable economic reason why firm managers, might concern themselves with both the expected profit and the distribution of firm returns around their expected value, hence providing a basis for aligning firm objective functions in order to avoid risk. Proper risk management is important in the daily operations of any insurance company to avoid financial losses and bankruptcy. In short,

preventing losses through defensive measures is a key element in reducing risks and consequently, a key driver of profitability (Kokobe & Gemechu, 2016).

Insurance companies use various techniques for managing risks. A company with any degree of risk exposure would develop a methodology that clearly indicates its approach to risk management techniques. Techniques used to manage risks include: loss prevention and control, loss financing, and risk avoidance (Ibid.).

4.1.1 Loss Prevention and Control

Loss prevention refers to the measures that reduce the occurrence of a certain loss, for example: measures that reduce truck accidents and strict enforcement of safety rules. To prevent or to minimize the chance of loss, insurance companies generally advise their clients that some preventive measures should be taken and the instillation of good housekeeping habits in their employees, such as not smoking on the premises or smoking only in designated areas, is needed. These advisory services are either for free or are considered as value added service with the insurance package. An experienced insurer also advises on the precautionary measures that could be installed in the client's building and states that certain measures could be put in place that reduce the severity of a loss, after it has occurred. Examples include: Installation of an automatic sprinkler system that promptly extinguishes fire and segregation of exposure units, so that a single loss cannot simultaneously damage all exposure units such as having warehouse with inventories at different locations. Therefore, good loss prevention and control practices are thought to enhance insurers' performance (Kokobe & Gemechu, 2016).

4.1.2 Loss Financing

Loss Financing is primarily dealing with ensuring the availability of funds, in the event of losses. This is a broad category that involves risk retention, risk transfer and diversification, as measures of loss financing.

Risk Retention is the act of keeping the possibility of loss with no attempt to transfer that loss to another party. Te method is appropriate when the risks of loss or the loss exposure is either

too small with little impact or too great to be able to do anything with it. Risk retention is regarded as self-insurance. In insurance companies, retention is used with other risk management techniques. For example, most insurance policies include a deductible so that the insured retains a portion of the loss (Ibid.).

Risk Transfer is the technique that insurance companies use to transfer the exposure of a loss to another person or entity which is able to bear the loss. Insurance companies, usually transfer risks through insurance and reinsurance diversification and hedging. A risk transfer involves causing another party to accept the risk. Reinsurance technique is used by an insurer to retain a bearable part and transfers the remaining part of the risk to the reinsurer who indemnifies him. By using a reinsurance technique, insurance companies can allocate risks to those parties who are most appropriate to bear them. This can reduce losses of the original insurer and therefore improve his financial performance (Kokobe & Gemechu, 2016).

Diversification is the technique that is used in spreading or diffusing risk exposures. It is a common technique of risk management that seeks to lower risk by combining exposures that are not related (not correlated) to one another. Diversification has got its foundation in capital markets portfolio theory which demonstrates how diversification permits the investors who averse to taking risk create portfolios that optimize various levels of risk and return (Ibid.).

4.1.3 Risk Avoidance

Risk Avoidance means that a certain loss exposure is never acquired or an existing loss exposure is abandoned. It is a technique, which implies that the chance of loss is reduced to zero because the loss exposure is never acquired. Insurance companies apply a system of policies and strategies in order to avoid the risk of bankruptcy provided their resources are applied effectively. They can also avoid risks by selling small policies instead of complete ones. Many insurance policies, although surprisingly popular should be avoided because they tend to be very profitable to the insurance companies but they lead to losses, especially when claims by clients build up. Such policies include; burial, children's life, disability and single disease such as cancer. But avoidance has two major disadvantages: the insurance company may not be able to avoid all the risks and it may not be practical to avoid all the losses. Therefore, avoidance may seem the answer to all risks, but avoiding risks also means losing out on the potential to profit from accepting (retaining) the risk. Not entering a business to

avoid the risk of loss, also avoids the possibility of earning profits (Kokobe & Gemechu, 2016).

4.2 Before the Crisis

Risk management can add value within insurance companies during "normal times". It begins with risk underwriting and ends with communication. More specifically, risk management adds value within an insurance firm in four critical areas.

4.2.1 Appropriate Risk Identification, Underwriting and Managing

Some firms may put a higher emphasis on risk reporting systems and complex metrics. The reality is that no amount of risk dashboards or risk-adjusted metrics will correct the performance drag of a poorly underwritten or positioned portfolio. As such, the most important question for Chief Risk Officers (CROs) to answer is whether the organization is doing "good business", day-in and day-out, every single day (Wilson, 2013).

4.2.2 Transparency of the Risk Profile of the Insurance Company

Unfortunately, solid underwriting is not enough. It is of paramount importance to ensure that each insurance policy is appropriately structured and underwritten. But even so, that does not necessarily guarantee that the resulting portfolio of policies is "appropriate"' or within delegated authorities for the firm (Ibid.).

4.2.3 Consistency of the Delegated Authorities with a Well Defined Risk Strategy

There is a relationship between the amount of risk that one takes and the amount that one expects to earn. However, the cumulative risks that a firm can take, will ultimately be constrained by the amount of capital that are available and the appetite to leverage that capital. An equally fundamental strategic decision defines which businesses to be in and which risks to accept in the first place, with risk naturally playing an important role, given how insurance companies create value by absorbing, managing and intermediating risk (Wilson, 2013).

4.2.4 Effective Communication Policy

If the company is solid, an effective risk communication will support a higher firm value. First, it will increases the confidence of rating agencies, regulators and, ultimately, customers, leading to lower capital requirements and higher RoEs. Secondly, it can insulate the firm from the deleterious valuation impact of "unexpected" earnings surprises. If everyone understands what businesses they are in and how the company creates value by taking risk, then no one should be surprised by the results, should the risks occasionally materialize (so long as they remain proportionate with the strategy) (Ibid.).

4.3 During the Crisis

During times of crisis the importance of scenario analysis and contingency planning increases dramatically. This is due to the rapidly unfolding events, increased uncertainty and a significant possibility of severe losses.

4.3.1 Scenario and Impact Analysis in a Crisis

Scenario and impact analysis plays a key role in preparing for a crisis. The first step is to understand and quantify what might happen. Scenario and impact analysis is a structured approach for characterizing complex, interconnected events and analyzing their impact. Scenario analysis proceeds in two generic steps. First, gather and prepare a cross-functional, experienced group of people to discuss and develop the scenarios (Wilson, 2013).

After the production of the scenarios, more specific and detailed steps in the scenario tree should be defined in order to facilitate their elaboration into the usual but trustworthy methodology of "best case", "baseline" and "worst case" scenario. At this stage it is important to consider not only the direct effects but also the potential for contagion that is likely to occur during periods of systemic stress. It is possible that there may be limited historical evidence to draw upon. In this case the process needs to be based more on judgment rather than direct statistical analysis (Ibid).

The second step is analyzing the multi-dimensional impact of the produced three scenarios, based on the insurance company's portfolio and business practices. This is also a process that is primarily based on the team's judgment (Wilson, 2013).

Finally it should be mentioned that a good scenario analysis is necessary, but not sufficient, to effectively steer the firm through the crisis. It is more important to take the right decisions and to execute them consequently. Too often this seems to be forgotten, thus leading to more focus on the analysis and less on the management's actions (Ibid).

4.3.2 Decision Making Process during a Crisis

In contrast to scenario and impact analysis, which typically requires objective, hard and quantitative discipline, taking and executing difficult decisions especially during crisis time, is where softer, biased and more qualitative issues may arise.

By definition, crises are times of significant uncertainty; taking large bets or placing the bar too high during such periods is not the appropriate way of doing business. It may lead to great rewards, but it can also lead to ruin. In normal times, it is right to take decisions having in mind the "baseline" scenario, a proper way of thinking, when the worst case scenario seems distant. Unfortunately, during times of crisis the "worst case" scenario becomes more likely and therefore impossible to ignore. In such circumstances, taking decisions based solely on the base case would be wrong — some degree of risk aversion should be incorporated into the decision making process. It is also crucial for the company, to take some kind of immediate action even if it is an action that is unpopular (Wilson, 2013).

Another measure that the company could take in order to protect itself is to start drafting a contingency plan to prepare the firm to act when required. Because of the accelerated time frame and high uncertainty, opportunities come and go rapidly, potentially leaving the miss-prepared behind. Preparing the company to act is critical and contingency planning can help by ensuring that the appropriate sense of urgency and consensus is built beforehand (Ibid).

Some other steps that a company should prepare during turbulence times are setting up a crisis response team that meets regularly, so that employees know who to contact that can respond quickly to an evolving situation. Assigning clear responsibility to execute the actions that are prescribed in a contingency plan is imperative. Finally training for and testing the contingency plan, even unexpectedly, to ensure that the mandated actions become second nature (Wilson, 2013).

4.4 After the Crisis

Although it is uncertain how any crisis will ultimately turn out and exactly what status the insurance company will find itself, looking forward to getting back to "business as usual" is not the proper way. Normal time's practices will need to be adapted and plans must be revised. Insurance firms have the responsibility to maintain underwriting discipline, even in the face of irrational exuberance, and to run a balanced portfolio, even in the face of an expanded market. "It is how the company chooses to participate in the "bull" markets that may very well determine the company's fate during the following "bear" market" (Wilson, 2013).

Chapter 5

Improvements in the Tools, Practices and Techniques and Factors that Define an Effective Insurance Risk Management Strategy

This chapter presents some improvements that can be made on the risk management tools, practices and techniques and the factors that define an effective insurance risk management strategy.

5.1 Improvements

Moving from the theoretical context of the previous chapter to the real life impact, Chief Risk Officers (CRO's) should confront the arisen issues correctly and execute their decisions consequently. Doing so requires organizational capabilities spanning the multiple dimensions of an Enterprise Risk Management (ERM) framework, including:

- Adequate systems, including having access to high quality, granular data in order to support risk and limit controlling, as well as underwriting activities.

- Analytical approaches for the accurate characterization, evaluation and aggregation of risk and risk adjusted performance, including for example risk evaluation or scoring, risk adjusted pricing or performance measurement, risk capital.

- Integration of risk into the key decision processes, including, eg the strategic planning process, the asset/liability management process, the underwriting process, risk identification and assessment processes.

- An adequate governance structure, supported by aligned incentives and a pervasive risk culture, with the required checks and balances supporting the common objective of doing good business every day (Wilson, 2013).

Ultimately, in the context of crisis management are the risk identification and management processes, important elements of any ERM framework. These processes, often based on scenario analysis and stress testing, are designed to identify, evaluate and quantify risks, leading to both direct actions and contingency or recovery plans to build institutional resilience. They usually are:

- Top Risk Assessment (TRA).

A structured process leveraging cross-functional personnel in identifying and managing the combined scenarios, that constitute the greatest threat, to the company's survival.

- Emerging Risk Assessment (ERA).

A structured process for identifying potential future adverse claims scenarios.

- Risk Controlled Self-Assessment (RCSA).

A structured process for identifying and managing the sources of operational and reputational risks, which can cause direct losses or impugn the firm's reputation, to such a degree, that a part of the franchise value is destroyed (Ibid.).

5.2 Factors that Define an Effective Insurance Risk Management Strategy

5.2.1 Introduction

Critical Success Factors are those performance factors which must be given the on-going attention of administration if the company is to remain competitive. While not intended for strategic planning purposes, the recognition of Critical Success Factors can help top management by:

- Determining where management awareness should be pointed.
- Developing measures for Critical Success Factors.
- Determining the amount of necessary information and thus limiting gathering unnecessary data (Galorath, 2006).

5.2.2 Bibliographical Reference

There are a number of papers on Critical Success Factors contribution to risk management. The definition of the Critical Success Factors was given by Rockart (1979) as "The limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization. They are the few key areas where things must go right for the business to flourish. If results in these areas are not adequate, the organization's efforts for the periods will be less than desired". Boynton and Zmud (1984) regard crucial effectiveness factor as one of the few things that ensures success for an organization, while Freund (1988) explained why a great number of factors are extremely difficult to focus on and therefore only five to ten should be indicated.

The following review of Critical Success Factors will examine them regarding effective risk management. Grabowski and Roberts (1999) consider the problem of risk mitigation. They identify four critical areas:

- Organizational Structuring and Design.
- Communication.
- Organizational Culture.

- Trust

Carey (2001) describes how to apply a specific approach in order to manage risk. It can be summarized in nine main issues:

- The importance of sound judgment
- Identification issues
- Keeping control of your reputation
- Assessing the importance of risks
- Verifying your judgments
- Changing management
- Embedding risks
- Cultural challenges
- Remuneration issues

Hasanali's paper (2002) is related to management in an organization. Her Critical Success Factors can be categorized into five categories:

- Leadership
- Culture
- Structure, roles, responsibilities
- Information technology infrastructure
- Measurement

NSW Department of State and Regional Development (2005) propose a practical guide for managing risk which provides a basic understanding of risk management in small businesses. It is argued that a business needs to adopt risk management because effective risk management is important. Therefore, risk management should include:

- Ensuring appropriate commitment to risk management
- Setting clear objectives and guidelines for risk management
- Allocating adequate resources
- Training staff appropriately
- Implementing systems for monitoring and reviewing risks

Galorath (2006) concentrates on the importance of risk management and assesses the processes to implement risk management. He claims that risk management requires five activities, which are:

- Top-level management support
- An integral part of the entire program management structure and processes
- The participation of everyone involved
- Cultural imperative
- A pattern of measurement

Na Ranong and Phuenngam (2009) argue that the turmoil of the financial industry emphasizes the importance of effective risk management procedures. Their research found a set of seven Critical Success Factors that can be used as a guideline on how to increase the effectiveness of risk management, which are:

- Commitment and support from top management.
- Communication.
- Culture.
- Organization Structure.
- Training.
- Information Technology.
- Trust.

A comparison of the different sets of the proposed Critical Success Factors between the different studies in chronological order is presented in table 1. The table seems to be the most complete model of effective risk management procedures.

Grabowski and Roberts (1999)	Anthony Carey (2001)	Farida Hasanali (2002)	NSW Department of State and Regional Development (2005)	Daniel Galorath (2006)	Na Ranong and Phuenngam (2009)
		Leadership	Ensuring Appropriate Commitment	Top-Level Management Support	Commitment and Support from Top Management
Communication	Verifying your Judgments			Participation of Everyone Involved	Communication
Organizational Culture	Cultural Challenges	Culture		Cultural imperative	Culture
Organizational Structuring and Design	Changing Management	Structure, Roles, Responsibilities	Setting Clear Objectives and Guidelines	Integral Part of the Entire Program Management Structure and Processes	Organizational Structure
	Embedding Risks		Training Staff Appropriately		Training
		Information Technology Infrastructure			Information Technology
Trust					Trust
	The Importance of Sound Judgment	Measurement	Allocating Adequate Resources	Measurement	**Other**
	Identification Issues		Implementing Systems For Monitoring and Reviewing Risks		
	Keeping Control of your Reputation				
	Assessing the Importance of Risks				
	Remuneration Issues				

Table 1: Comparison between proposed Critical Success Factors from different studies (source: modified from Na Ranong, P. & Phuenngam, W., 2009. *Critical Success Factors for effective risk management procedures in financial industries*, p. 13)

The entire above factors that have been presented in the above mentioned studies and in many more, the majority of them are included in the above table with the same or similar name and with the same or similar meaning. A detailed analysis of the table variables will therefore be made to further understand the variables to be adopted during the research methodology of this master thesis.

1. **Commitment and Support from Top Management.** Commitment and support from head management plays a key role in influencing the success in almost all the initiatives within an organization (Hasanali, 2002). An organization utilizes risk management to anticipate the probability of a negative impact and that risk management process needs top-level management support. Risk management requires both the acknowledgement that risk is a reality and commitment to identify and manage risk (Galorath, 2006).

    Top management put forward and decide objectives and strategies for the organization's risk management activities, mission and overall objectives (Henriksen and Uhlenfeldt, 2006). Young and Jordan (2008) suggest that "the essence of top management support related to effective decision-making, is to manage risk and to authorize business process change". A crucial part of a successful project is top management support, the benefit of which is related to improving decision making in order to manage risk. Top-level management responds to business processes and manages risk. Successful reduction or bearing of risk is potential, upon commitment and support from top management.

    These concepts refer to the highly needed support and approval from head management for risk management. The essence of commitment and support from top management supports the effective decision-making process in order to handle risk. Commitment and support from top management is important in every kind of management and it is thus an important factor for risk management (Na Ranong & Phuenngam, 2009).

2. **Communication.** Most organizations accept that good communication is extremely important. Different employees have different ideas and discussion between them is therefore based on different assumptions. They simply want to get a clear message across and discussion may be the best channel to broadcast messages. Other

employees may wish that head management discuss future plans with staff. Internal communication should back business strategy and improve business procedures as well as performance (Quirke, 1996).

Grabowski and Roberts (1999) claim that communication plays an important role in risk reduction. It provides opportunities for clarification, for making sense of the organization's progress, and for members to discuss how to improve the organization and the impact of using different risk reduction strategies.

Here, communication is another important consideration for effective risk management. The communication procedure provides opportunities for members to understand their roles and responsibilities as the structure of the organization changes. Financial institutions need to think of the concept of verifiability. If a different group of members comes to identical decisions about the importance of risks, it would come to the same conclusions (Carey, 2001).

There is an ever-increasing need for communication professionals to guarantee that employees are informed of relevant happenings both inside and outside their company. A good manager must also be a good communicator and training in communication must play an even bigger role in managerial training in the future.

3. **Culture.** Culture consists of patterns of values, ideas, thoughts and feelings and is forwarded by symbols as factors in forming behavior. Aftermaths of beliefs, attitudes and skills affect thoughts, emotions and actions (Hofstede, 2001).

    According to Hasanali (2002) "Culture is the combination of shared history, expectations, unwritten rules, and social customs that compel behaviors. It is the set of underlying beliefs that, while rarely exactly articulated, are always there to influence the perception of actions and communications of all employees". In any situation where cooperation is important in order to solve a crisis, culture is a crucial factor for eagerness to learn from mistakes. But an insurance firm consists of many different sectors and thus cultures and so developing a company's culture is very difficult. It is not only one factor that encourages the employees to work more but also to work more efficiently.

Grabowski and Roberts (1999) suggest that risk management demands the combination of several cultures that make the system into a coherent set in which the assumptions and values of each of the sectors can be built around the need for creating a single culture. In particular circumstances, teamwork can develop a behavior by sharing personal beliefs, conducting meetings and seeking consensus in order for management to succeed.

The importance of culture within effective risk management is that knowledge transmission requires individuals to come together to cooperate, exchange ideas and share knowledge with one another. Moreover, culture creates persons who are continuously encouraged to generate new ideas, knowledge and solutions.

4. **Organizational Structure.** One of the most important factors for effective risk management is organizational structure. Grabowski and Roberts (1999) suggest that risk management is primarily linked with the fluidity of organizational structures. Responding in different ways and answering quickly in the face of changing conditions is an adaptable approach.

The financial world is in constant variation. The environmental condition will change and some things new will build up gradually over time, while others may sweep the market quickly. Organizational structure must be reviewed regularly and attuned to adapt to changing financial environments. The management's role is to suggest policies for managing risk, the committee's role is to react to review and to endorse them, and it is the management's role once more to execute them and report back on them (Carey, 2001).

Organizational structure provides the concept, principle, route and support to the employee that is conducted by the steering committee. They design and teach employees to communicate in and use a common vocabulary. The employees work as a team in order to prevent a silo mentality and include resistant employees in the process (Hasanali, 2002). NSW Department of State and Regional Development (2005) believe that setting clear objectives and guidelines is necessary for risk management.

Risk management responsibilities and authorities must be delegated to appropriate personnel. They should decide what must be done for producing and assessing risk management possibilities and selecting a structural approach in order to evaluate risk management options. The effectiveness of alternative strategies is balanced within established risk restrictions.

5. **Training.** Nowadays, almost all firms provide some type of training to their employees. Some companies have a very official process of training while other companies hire outside mentors to conduct employee training seminars.

The training methods used by organizations can be categorized into two systems. The first is on-the-job training which provides one-on-one instruction, tutoring, job alternation and an apprenticeship / internship. The second method is off-the-job training which is carried out away from the worksite. It covers a number of procedures, classroom lectures, films, demonstrations, case studies, other simulation exercises and programmed instructions (Treven, 2003).

The success of the training program is usually influenced by the following features:
- The high quality of the training manual.
- The use of an ongoing mentorship program during the course.
- The high degree of interactive learning engaged during the program.
- The extensive use of self and peer group critiquing skills.
- The extensive use of problem-based learning strategies throughout the program.
- The critical support of highly motivated training staff.
- The motivation of continuous assessment throughout the course.
- The educator's input released in a working, subject-oriented context (Moss, 1997).

Carey (2001) shows that the ability to respond to shifting conditions in an organization's operations relates to a variety of activities including the development of risk training courses and the involvement of staff in reacting to early warning systems.

Effective risk management is becoming part of good business habits and includes training of staff appropriately. The main reason for a training program is not only to ensure that employees are secure with the company's system, but also to increase their skill and knowledge. Training not only uses new systems, but also new processes and is familiar with the integration within the systems – how the work of one employee influences the work of another (NSW Department of State and Regional Development, 2005).

6. **Information Technology.** Information Technology (IT) is consisting of two parts:

- The information systems (including related information) on which the critical business functions and processes depend.

- The computer technologies (hardware and software) which back the processing, storage and supply of the company's data and information (Halliday, et al., 1996).

Firms need to consider IT as an important factor in the face of increasing antagonism, higher performance levels, globalization, and liberalization. IT plays a key role in achieving company's objectives. It relates to all aspects of the business procedures, including access to a shared infrastructure consisting of knowledge, human assets, core capabilities, resource allocation, performance management, project tasking and communication support (Mutsaers, et al., 1998).

Moreover, if a firm is on a large scale, it would be difficult for members to interconnect and share information without an information technology infrastructure. Information technology can enable punctual searches, the access of and retrieval of data, and sustain communication in a firm (Hasanali, 2002).

IT can create an important link between risk management and corporate performance. It provides data security by employee level, limiting a user's access by time, line of business, business activity and individual risk. IT tools collect data used in the past, so companies can learn through experience and avoid doing again the same mistakes. Therefore, Information Technology (IT) is another vital factor for successful risk management (Rolland, 2008).

7. **Trust**. Trust involves two parties: the trustor and the trustee. Over the last numerous years, trust has become a central topic of study in firms. Trust is important because of the strong wish to understand how to create efficient cooperation within organizations. Trust is therefore a key because it enables cooperation. The success of an organization is related to its ability to handle effective cooperation. Trust is important for project performance. Trust, enhances the strength of working relationships, hardens partnering roles, and increases the willingness of various project stakeholders to cooperate. Trust comes from replies regarding the sharing of materials, information, resources and displaying good intent behavior (Tyler, 2003).

Risk management needs cooperation and teamwork promotes success. Trust among an organization's members is an important precondition to change those related to alliances. Grabowski and Roberts (1999) suggest that trust permits an organization's members to concentrate on their mission, free by doubts about other members' roles, responsibilities and resources, and that with trust, synergistic efforts in an inter-organization's mission are possible. Risk management engages in activities that encourage share obligations. Thus, one of the means of driving efficient risk management is trust.

Chapter 6

Empirical Approach

In this chapter the research methodology and the questionnaire structure are presented.

6.1 Methodology

Based on the structured questionnaires and the variables used in them by various researchers (for example: Galorath 2006; Grabowski & Roberts 1999; Na Ranong & Phuenngam 2009), this postgraduate dissertation attempted to include in the questionnaire the most important and representative factors or groups of factors (including at the same time several others in the same category). The goal is all these factors to describe as fully as possible an effective (during the perception of Greek chief risk officers) risk management strategy and to define the level of it in Greece. At the same time, was examined the room for future improvement of the effective insurance risk management strategy.

As mentioned above, a structured questionnaire (using the poll method) was used, and this is because these type of questionnaires are strict, consist of closed usually questions where the answers are predetermined, and do not allow the researcher to change the order of questions in his own judgment (Zafiropoulos, 2015), thus ensuring objectivity. In addition, structured questionnaires are used in quantitative surveys (such as the present Masters dissertation) which are made to measure how much or how many choose a particular view or attitude. From the large typically samples of respondents primary data are been collected for measuring attitudes. These data are then analyzed by statistical techniques and methods. Findings are usually listed in tables and commented on two main objectives, initially to describe and then calculate the correlations or effects between the variables measured by the

questionnaire. The findings, given that they were calculated from a representative and well-designed sample, are largely generic and can naturally be compared with corresponding secondary data, which are surveys and statistics that already exist (Zafiropoulos, 2015).

In the present master thesis, the quantitative method will be used and will be based on results, assessments, conclusions and comparisons with corresponding surveys of the past.

The structured questionnaire used was built through Google's free application (see Annex I) and was distributed online and privately to make the results more impartial, reliable and representative. Moreover, the response rate of respondents to online surveys is quite low, of 4%, probably due to suspicion, fear of transmission of viruses, unwillingness to communicate their personal e-mail to strangers, and what is also observed is that the participation of young people is larger, and often in academic surveys, students and generally young people provide relatively easier their answers.

If the above obstacles are overcome in some way so as to increase the percentage of participation, the implementation of web surveys by "uploading" to a questionnaire site (where respondents are asked to fill in by selecting and checking their answers with the mouse) offers great potential to the researcher. The investigator can at all times monitor how many respondents have previously participated in the survey and directly calculate the statistical results at any given time as the data goes directly into a database to be processed without having to go from paper to computer as in classical inquiries with a questionnaire.

In any case, the construction of the questionnaire (since this option is now available) is preferable to be done on the Internet because the companies providing such services have simplified the procedures for constructing a questionnaire and drawing the final answers so that even the novice user can create an extremely attractive in appearance and professional questionnaire through a variety of choices, and complete a survey.

In this specific master dissertation for insurance risk management, after the on-line questionnaire was constructed, the final data was downloaded in .csv file format and then inserted into the SPSS statistical program for processing and analysis of the results through appropriate price coding of the variables (there is also the option to "download" the data and process it in Excel format).

A necessary prerequisite for using the Google app is to create a Google account. For the construction of the questionnaire or otherwise called "Google form", there are many possibilities, such as entering pictures in the questionnaire, determining the format of the questions (open, closed, scale, multiple choice or list selection) and formatting of the answers they will receive. In addition, in this questionnaire, the required questions were stated where necessary, so that the respondent could not proceed without answering them. In this way it was ensured the absence of missing values in basic questions (Zafiropoulos, 2015).

6.2 Structure of the Questionnaire

A structured questionnaire generally consists of items. Usually these items are questions that can be answered either with a single or with multiple answers. Other ways of answering the questions are either the statement of the agreement degree on a Likert scale or the registration of quantitative information such as the answer to the question "how many years of work experience do you have in the risk management sector" (Ibid.).

In this post-graduate dissertation, in order to create the questionnaire, entitled "Risk Management Strategy of Insurance Companies", an attempt was made to observe all the rules - advice in the bibliography for the creation of a correct questionnaire, such as:

- Be attractive in appearance.
- Include brief and clear completion instructions.
- Questions to be consistent and lead the respondent smoothly from one topic to another. In this direction it helps to group them into questions such as of opinions, attitudes, knowledge.
- The questions should be brief, clear and comprehensive and should be as simple as possible consisting of simple vocabulary, depending on the purpose of the research. In

addition, where necessary, to facilitate answering, questions and examples should be used.

- Questions based on the criterion of simplicity (ranging from simple to more complex) to be interesting and relevant to the subject of the survey so as to stimulate the interest of the respondent and increase the percentage of answers (Zafiropoulos, 2015).

The structure of the questionnaire is "inspired" by the work of Na Ranong & Phuenngam (2009), who in turn relied on the work of other researchers such as Galorath (2006), Grabowski & Roberts (1999) and Hasanali (2002).

The questionnaire for the research purposes of this master dissertation was also conceptually separated (different is the form of the questionnaire seen by the respondent for simplicity and smooth continuity - see Annex II - and will be analyzed below) in three areas:

1. Demographics – general information: Questions that have been included in this section concern the years of experience in the risk management sector, the expectations from an effective insurance risk management strategy and the supportive actions of the risk management policy. For obtaining such information multiple choice questions were used (one or more answers). Questions concerning sex, age, marital status, educational level etc., weren't included in the questionnaire because they were considered as irrelevant with the master thesis' topic, or because their impact was considered statistical insignificant. For example, the educational level of the respondents is a priori very high (certainly above high school), and their views about risk management depend mainly on their expertise, working experience and knowledge rather than sex, age, marital status and so on.

2. Factors that determine an effective insurance risk management strategy. Furthermore was examined the room for future improvement of those factors and therefore of the insurance risk management strategy.
   - Communication and collaboration with other departments (Undewriting, Actuarial etc.): 4 items (questions) were included in the questionnaire regarding this factor.
   - Market research and identification of possible risks: 3 items.

- Regulatory compliance (level of technical reserves etc.): 3 items.
- Effective fraud detection protocols (fraud experts etc.): 3 items.
- Proper balance of premium - level of risks, in order payment of claims and legitimacy to be ensured: 3 items.
- Outsourcing (help of specialized in Risk Management audit firms): 3 items.
- Expertise and experience of executives in proper evaluation, prioritization and treatment of risks (loss retention, loss reduction, loss prevention, transfer of risks - reinsurance): 4 items.
- Support and commitment from top management: 3 items.

To measure the significance of the above factors, multiple choice questions (one or more answers) were used, and mainly the widely used Likert scale with a five-degree rating, where the answers ranged from "Not at all" to "Too Much".

In addition, a "Yes / No" dichotomous question was used in the "Room for Future Improvement" section.

3. Measurement of total effectiveness of the insurance risk management strategy: with one item, it was asked by the risk officers, through a five-degree Likert scale, to define the degree of total effectiveness of their insurance company's risk management strategy. By the same way was examined the room for improvement of the effective insurance risk management strategy (taking into consideration of all the determinants).

The conceptual framework of the present post graduate dissertation examining the linkage between effective insurance risk management strategy and aspects of determinants, under the influence of the demographics, is illustrated in Figure 4.
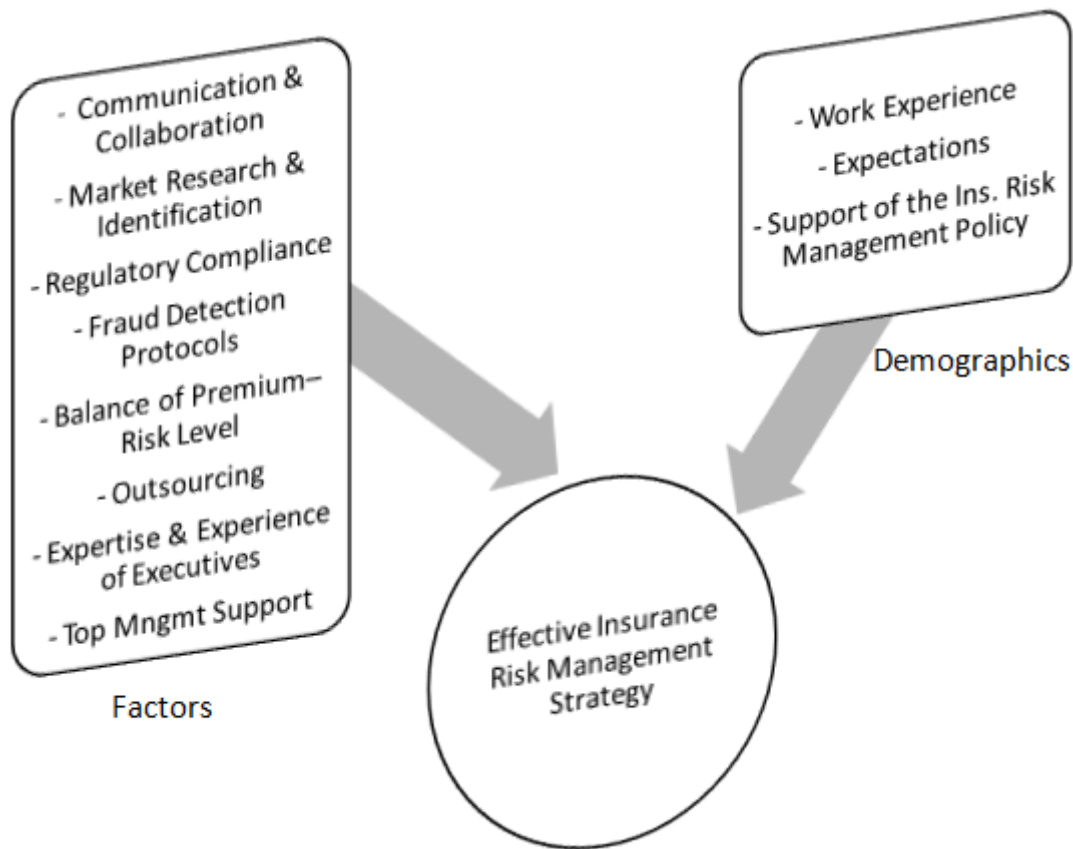
Figure 4: Hypothesized determinants and effective insurance risk management strategy linkage model

As regards the form of the questionnaire and how it has been drawn up to make it simpler for the respondents and to facilitate them in their answers (see Annex II):

- On the first page informs briefly and comprehensively the respondents on the issue of thesis and provides other relevant information.
- The first section is about demographics – general information and consists of three questions.
- The second section is on determining the effective insurance risk management strategy and consists of ten questions.
- And in the third section, is explored the room for future improvement of the effective insurance risk management strategy, and consists of ten questions.

6.3 Sampling and Sample Size

In order to determine the effective insurance risk management strategy in Greece, was selected an as random and representative as possible sample (where all the members of the insurance company population have the same and independent probability of being included in the sample) of executives of insurance companies that have direct relationship with risk management.

Sampling is used when the population to be studied is very large, and examining each member is very difficult and costly, if not impossible. Therefore, the appropriate sample is selected so as to attempt with the least possible errors - deviations, deduction of the results to the whole population.

In this diploma, non-proportional stratified sampling was originally used in the sense that the questionnaire was distributed to randomly selected insurance executives (and not to those who did not work in insurance companies), and more specifically to 150 executives ("non proportional" means that wasn't selected a specific number of people from each insurance company according to the size of the company or its market share) and then the non-probabilistic method of the sample of convenience (judgmental sampling) was applied.

150 questionnaires were distributed totally (either online or in hard copy) to a target group of insurance executives with range of positions from supervisors to board of directors (in departments like underwriting, actuarial, risk management, reinsurance) for the reason that top- level management is directly related with risk management. The 106/150 questionnaires were finally answered, so this is the sample size. The collection of responses took place within about 3 weeks until mid-December 2017.

In addition, the validity of the questions is based, as mentioned above, on similar research on risk management and various other sources (relevant bibliography, internet, academic articles, etc.) and the internal coherence of the questionnaire was carried out with the control of credibility.

6.4 Research Limitations

The current research field is limited with regard to the Greek reality and the Greek statistical data, so that cannot be made valuable and extensive comparisons.

In addition, the sample collected concerns the Greek insurance companies and would be extremely risky if the results of this survey would generalized for the European countries or for the whole world. This could be done more safely if the clearly larger sample consisted of representative samples from each country.

6.5 Statistical Analysis Tools

As mentioned above, the well-known and easy-to-use statistical program SPSS (Statistical Package for Social Sciences) was used to process data and analyze the results. Where relevant for the purposes of this study, descriptive statistics and, in particular, crosstabulation analysis were used to demonstrate the correlation between two variables. This is because, with regard to univariate analysis, this is done to a great extent by Google's forms through the presentation of the appropriate charts. Finally, the research objectives are completed using the econometric model of multiple regression (multiple regression analysis) to identify all significant factors impact on the effective insurance risk management strategy, to analyse multicollinearity etc.

Chapter 7

Empirical Findings

In this chapter, there is detailed presentation of the empirical findings, using SPSS, through techniques of univariate, bivariate or multivariate descriptive analysis and finally, through multiple regression analysis.

7.1 Entering Data into SPSS

To achieve the analysis of the results with final step the linear regression analysis with the use of dummy variables, the data collected from the questionnaire, introduced in SPSS and coded as shown below (figure 5):

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Work_Experience	Numeric	8	2	How many years of work e...	{1,00, Less ...	None	8	≣ Right	▨ Ordinal	↘ Input
2	Reduction_of_financial_losses	Numeric	8	2	Reduction of financial losses	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
3	Better_Allocation_of_Resour...	Numeric	8	2	Better allocation of resources	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
4	Improvement_in_Decision_m...	Numeric	8	2	Improvement in decision m...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
5	Better_Communication	Numeric	8	2	Better communication with...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
6	Setting_up_Risk_Mngmnt_T...	Numeric	8	2	Setting up Risk Manageme...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
7	Reg_Revision_of_Risk_Man...	Numeric	8	2	Regular revision of Risk Ma...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
8	Training_of_Risk_Officers	Numeric	8	2	Extensive and continuous t...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
9	Access_of_Front_Line_Emp...	Numeric	8	2	Front line employees can e...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
10	Strict_Adherence_to_RiskM...	Numeric	8	2	There is strict adherence t...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
11	Communication_with_other_...	Numeric	8	2	Communication and collab...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
12	MarketResearch_and_Risk_...	Numeric	8	2	Market research and identif...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
13	Regulatory_Compliance	Numeric	8	2	Regulatory compliance (lev...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
14	Fraud_Detection_Protocols	Numeric	8	2	Effective fraud detection pr...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
15	Balance_of_Premium_RiskL...	Numeric	8	2	Proper balance of premium...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
16	Outsourcing	Numeric	8	2	Outsourcing (help of speci...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
17	Expertise_and_Experience_...	Numeric	8	2	Expertise and experience ...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
18	TopManagement_Support	Numeric	8	2	Support and commitment fr...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
19	CommunicationCollaboration...	Numeric	8	2	How strong do you conside...	None	None	8	≣ Right	✎ Scale	↘ Input
20	RiskIdentification_Evaluation	Numeric	8	2	How strong do you conside...	None	None	8	≣ Right	✎ Scale	↘ Input
21	RegulatoryCompliance_Eval...	Numeric	8	2	How strong do you conside...	None	None	8	≣ Right	✎ Scale	↘ Input
22	FraudDetectionProtocols_Ev...	Numeric	8	2	How effective do you consi...	None	None	8	≣ Right	✎ Scale	↘ Input
23	PremiumRiskBalance_...	Numeric	8	2	According to your professi...	None	None	8	≣ Right	✎ Scale	↘ Input
24	OutsourcingAcceptance_Ev...	Numeric	8	2	How succeptible is your in...	None	None	8	≣ Right	✎ Scale	↘ Input
25	ExpertiseExperience_Evalua...	Numeric	8	2	In your insurance company...	None	None	8	≣ Right	✎ Scale	↘ Input
26	TopManagementSupport_Ev...	Numeric	8	2	How strong do you conside...	None	None	8	≣ Right	✎ Scale	↘ Input
27	TotalEffectiveness_of_InsRis...	Numeric	8	2	Define how effective, do yo...	None	None	8	≣ Right	✎ Scale	◉ Target
28	Plans_for_Improvement_Ins...	Numeric	8	2	In the near future, has your...	{,00, No}...	None	8	≣ Right	♣ Nominal	↘ Input
29	Communication_Room_for_I...	Numeric	8	2	Evaluate the room for impr...	None	None	8	≣ Right	✎ Scale	↘ Input
30	RiskIdentification_Room_for...	Numeric	8	2	Evaluate the room for impr...	None	None	8	≣ Right	✎ Scale	↘ Input
31	RegulatoryCompliance_Roo...	Numeric	8	2	In your insurance company...	None	None	8	≣ Right	✎ Scale	↘ Input
32	PremiumRiskLevelBalance_...	Numeric	8	2	Evaluate the room for impr...	None	None	8	≣ Right	✎ Scale	↘ Input
33	PremiumRiskLevelBalance_...	Numeric	8	2	MEAN(PremiumRiskLevel...	None	None	8	≣ Right	✎ Scale	↘ Input
34	ExecExpertise_Room_for_I...	Numeric	8	2	Evaluate the room for futur...	None	None	8	≣ Right	✎ Scale	↘ Input
35	TopManagSupport_Room_fo...	Numeric	8	2	Evaluate the room for futur...	None	None	8	≣ Right	✎ Scale	↘ Input
36	FraudDetectProtocols_Roo...	Numeric	8	2	Evaluate the room for futur...	None	None	8	≣ Right	✎ Scale	↘ Input
37	Outsourcing_Room_for_Improv	Numeric	8	2	Evaluate the room for futur...	None	None	8	≣ Right	✎ Scale	↘ Input
38	TotalRoom_for_Improv_of_Ef...	Numeric	8	2	Evaluate the room for impr...	None	None	8	≣ Right	✎ Scale	◉ Target
39	Till_5Years_WorkExp	Numeric	8	2	Till_5Years_WorkExp	None	None	8	≣ Right	♣ Nominal	↘ Input
40	WorkExp_11_15_Years	Numeric	8	2	WorkExp_11_15_Years	None	None	8	≣ Right	♣ Nominal	↘ Input
41	WorkExp_Over_15_Years	Numeric	8	2	WorkExp_Over_15_Years	None	None	8	≣ Right	♣ Nominal	↘ Input
42	WorkExp_11Years_and_more	Numeric	8	2	WorkExp_11Years_and_m...	None	None	8	≣ Right	♣ Nominal	↘ Input

Figure 5: Entry and encoding of data in SPSS

7.2 Univariate Descriptive Analysis

At this stage, respondents 'demographics will be analyzed (through Google forms) and the main factors (according to the sample responses) that affect an effective insurance risk management strategy as well as the room for future improvement of this strategy.

7.2.1 Demographics

How many years of work experience do you have in the Risk Management Sector?
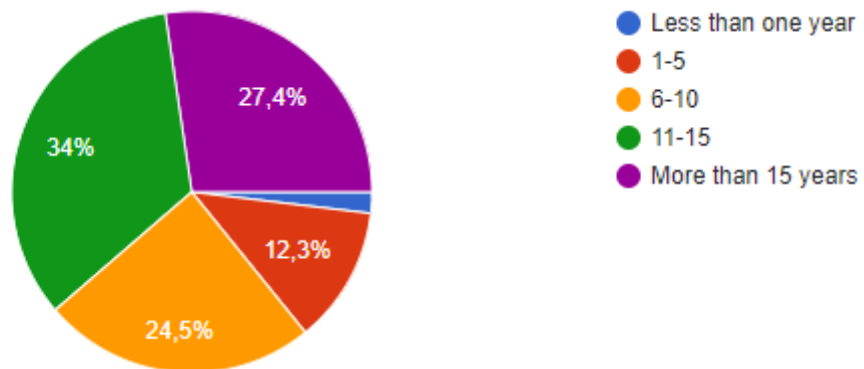
Diagram 17: Work experience of top executives in risk management (106 answers)

As it can be seen from diagram 17, the 61.4% of respondents consists of executives that their work experience is over 11 years (34% for wok experience 11-15 years and 27.4% for work experience "more than 15 years"). This high percentage can be explained by the fact that executives in managerial positions (from supervisors to board of directors) usually have "strong" work experience in order to handle various demanding circumstances.

What do you expect from an effective Insurance Risk Management Strategy (one or more answers)?

Diagram 18: Expectations from an effective insurance risk management strategy (106 answers)

Reduction of financial losses is the primary concern of risk officers (diagram 18) with a percentage of 87.7% and "improvement in decision making" is the second biggest expectation (76.2%) from an effective insurance risk management strategy. But also, "better allocation of resources" (64.2%) and "better communication with the stakeholders" (49.1%) "play" important role in executives' expectations.

How the Risk Management Policy of your Insurance Company is supported (one or more answers)?
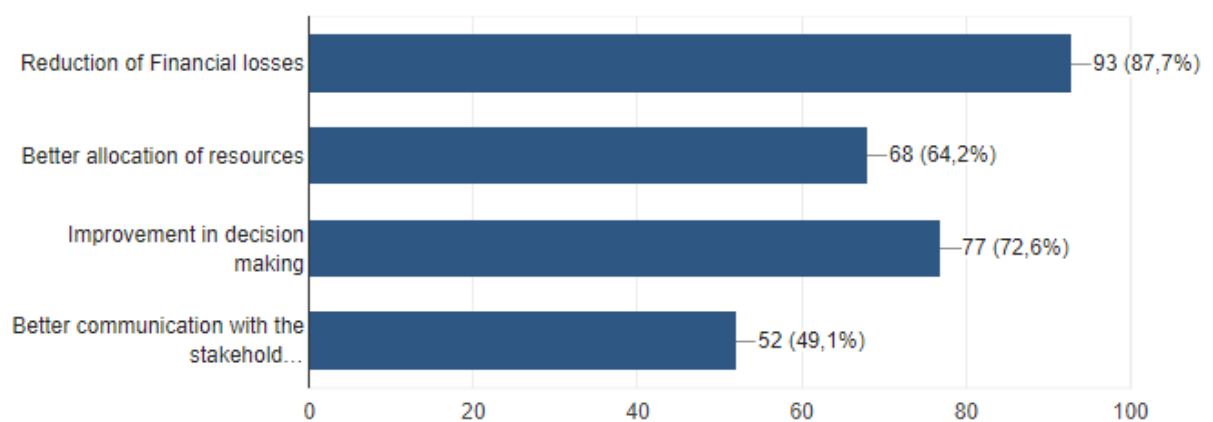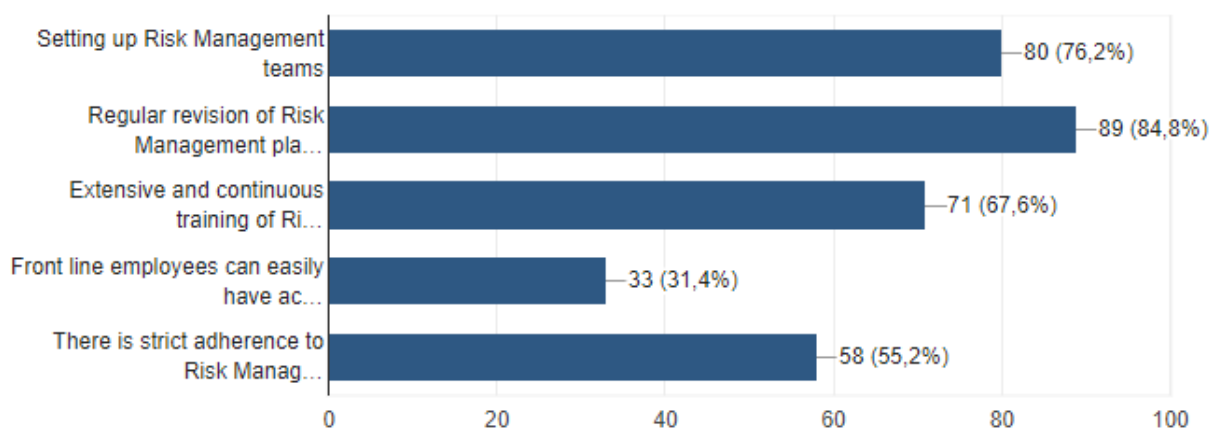

Diagram 19: Support of the insurance risk management policy (105 answers)

"Regular revision of risk management plans" (84.8%) (diagram 19), according to changing socioeconomic conditions, is the first supporting action of risk management policy in respondents insurance companies. "Setting up risk management teams" (76.2%) is the second supporting action. Nevertheless, a high percentage of respondents (55.2%) answered that one of the supporting actions of their company's risk management policy is "strict adherence to risk management policy", an element that is rather negative, because the global business environment is dynamic and strict adherence to anything must be replaced by flexibility.

All of the above demographics are aggregated as follows (table 2):

Variables		Responses	%
Expectations from effect Ins. Risk Mngmt Strategy	Reduction of financial losses	93	32.1
	Better allocation of resources	68	23.4
	Improvement in decision making	77	26.6
	Better communication with the stakeholders	52	17.9
Total		290	100.0
Support of the Ins. Risk Mngmt Policy	Setting up Risk Mngmt teams	80	24.2
	Regular revision of Risk Mngmt plans	89	26.9
	Extensive and continuous training of Risk Officers	71	21.5
	Front line employees can easily have access to top executives in order to refer problems/risks	33	10.0
Total		331	100.0
Work Experience in the Risk Mngmt sector (years)	Less than one year	2	1.9
	1 – 5	13	12.3
	6 – 10	26	24.5
	11 – 15	36	34.0
	More than 15 years	29	27.4
Total		106	100.0

Table 2: Demographics of sample respondents in the insurance risk management sector

7.2.2 Univariate Descriptive Analysis and Determinants of the Effective Insurance Risk Management Strategy

As in other surveys (e.g. Na Ranong & Phuenngam, 2009), communication and collaboration is a factor that most respondents (counting 90 out of 106) (diagram 20) consider as the most decisive for an effective insurance risk management strategy, along with "market research and identification of possible risks" (also 90/106). Communication gives opportunities for clearing up, for making sense of an organization's growth, and for members to discuss development to an organization and the impact of using various risk mitigation strategies (Carey, 2001). One possible interpretation of respondents' choice to highlight communication and risk identification as the most important factors, is that in order effective insurance risk management to take place, it is vital that market research and risk identification should be efficiently applied and then, the results of this research should be effectively communicated to coworkers and the other departments of the insurance company (Undewriting, Actuarial etc.).

Which of the following factors do you consider decissive for an effective Insurance Risk Management Strategy (one or more answers)?
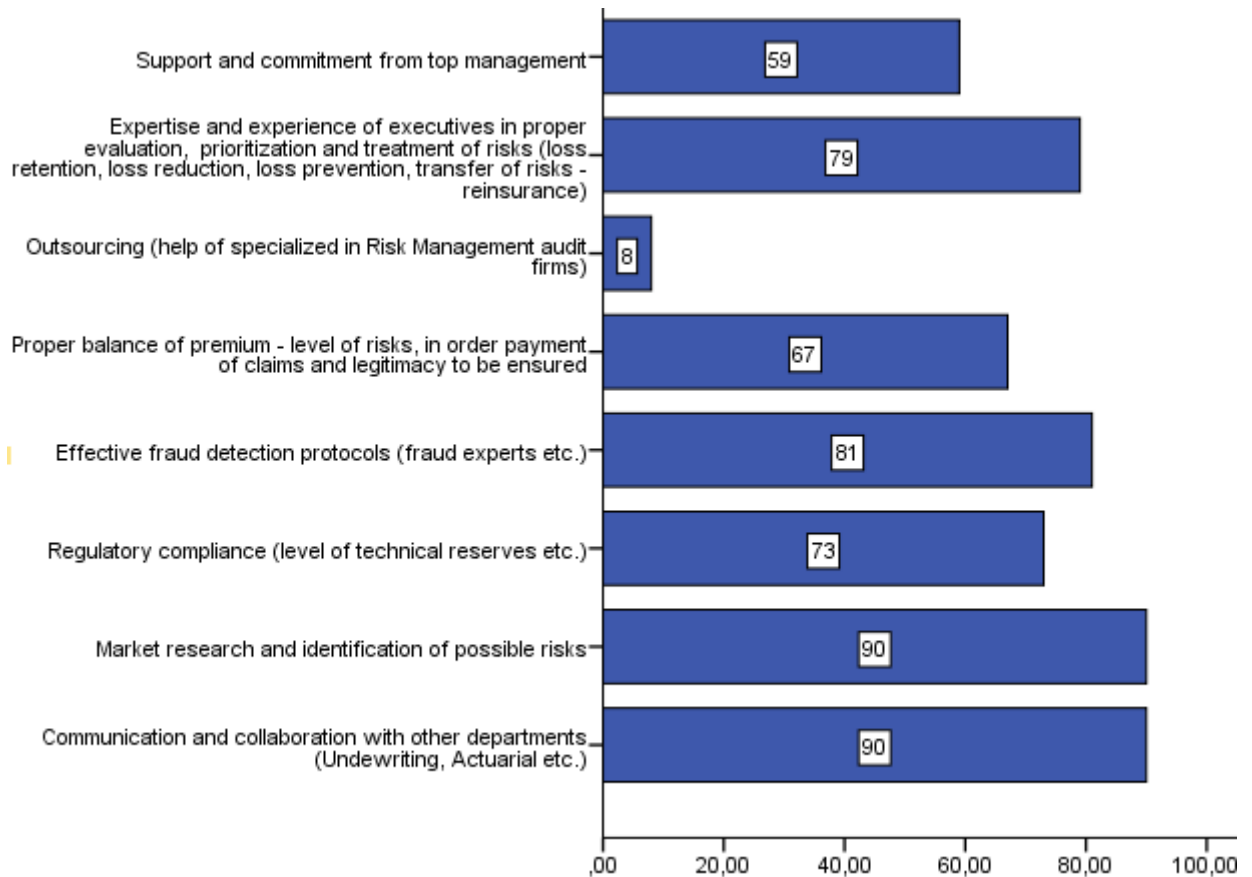
Diagram 20: Responses regarding determinants of the effective Ins. Risk Mngmt Strategy

Effective fraud detection protocols is according to respondents the second most important factor (81/106) for an insurance company's risk management strategy in order payment of claims to come along with risk assessment and evaluation (probability estimation etc.).

Expertise and experience of executives in proper evaluation, prioritization and treatment of risks (loss retention, loss reduction, loss prevention, transfer of risks - reinsurance) is almost equal (79/106) with fraud detection protocols. The interpretation is that the high tech equipment (protocols, software etc.) that an insurance company must have, is not very effective if the responsible personnel isn't high skilled.

Lastly, it is very interesting the fact that only 8/106 Greek respondents consider 'outsourcing' (help of specialized in risk management audit firms) as an important factor for an effective insurance risk management strategy. It could be hypothesized that in Greece, top risk officers working in insurance companies, consider that "foreigners" cannot understand fully the internal procedures and special problems of a company and therefore, they cannot propose the most effective solutions.

Of the eight total factors determining, according to the respondents' assessment, an effective insurance risk management strategy, the four above that emerged as the most important, will be described below. The four less important factors (their descriptive statistics are included in annex I), according to the sample responses, are "Regulatory compliance (level of technical reserves etc.)" (73/106), "Proper balance of premium - level of risks, in order payment of claims and legitimacy to be ensured" (67/106), "Support and commitment from top management" (59/106) and as mentioned before "Outsourcing (help of specialized in Risk Management audit firms)" (8/106).

How strong do you consider is the communication & collaboration in your Insurance Company?

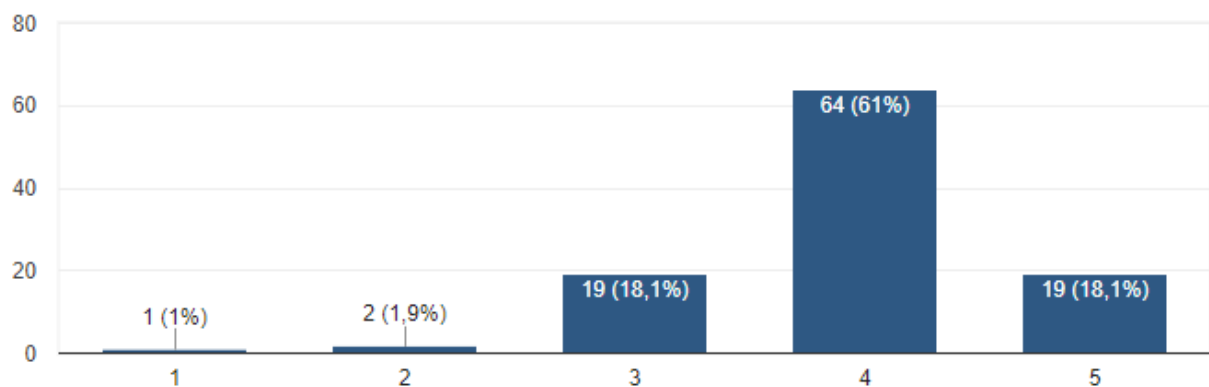**Diagram 21: Evaluation of communication & collaboration**

Through the Likert five-level scale mentioned in the previous chapter, it appears in diagram 21 that the highest percentage of responses (61%) corresponds to the score 4 = "much" in communication and collaboration as one of the decisive factors of effective insurance risk management strategy and therefore, of the viability of their company.

How strong do you consider is the market research and identification of possible risks in your Insurance Company?
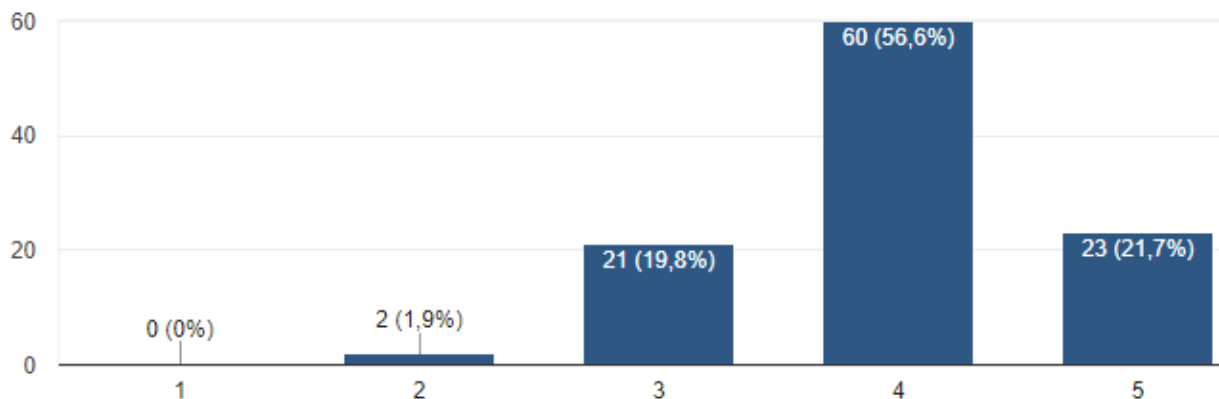
Diagram 22: Evaluation of risk identification

In diagram 22, the highest percentage (56.6%) of respondents consider that their company's market research and risk identification corresponds to the level 4 = "much".

As long as it takes the other two of the most important factors namely, fraud detection protocols and expertise of executives, the highest percentage of responses, 50% and 55.8% respectively (all the omitted descriptive statistics are included in annex I) corresponds again to the level 4, a clue that provides the information that the insurance companies in Greece in order to sustain during crises pay high attention to determinants of effective insurance risk management strategy, but also there is still room for improvement.

Indicatively, the room for improvement of communication & collaboration and risk identification, is "very much" (level 5 of the Likert scale) according to the highest percentage of respondents which is exactly the same (48.1%) for both factors (diagrams 21 and 22). As long as it takes the other two of the four factors – expertise of executives and fraud detection protocols - that have emerged as the most important, again the highest percentages of respondents are almost equal (53.3% and 53.8% respectively) and correspond to level 5 = "very much" of the Likert scale.

Evaluate the room for improvement of communication & collaboration in your insurance company
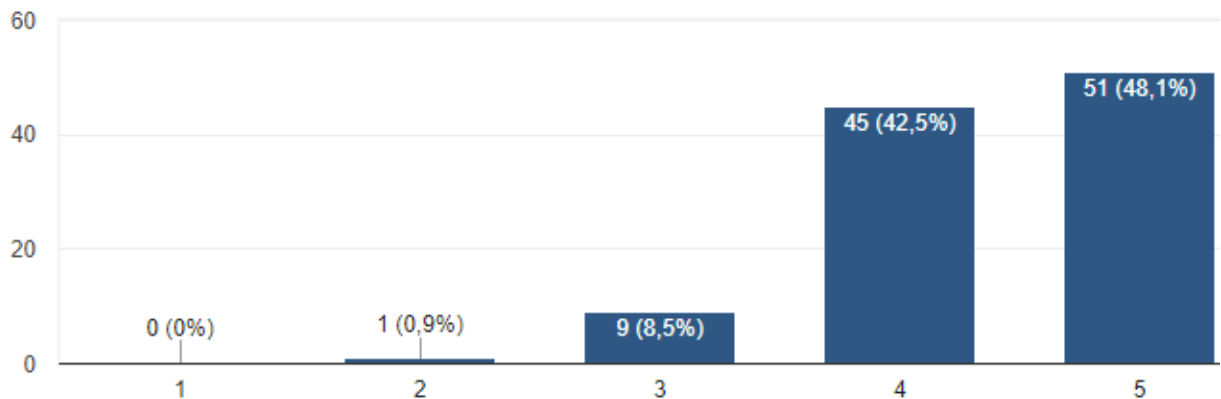
Diagram 21: Room for improvement of communication & collaboration

Evaluate the room for improvement of market research and risk identification in your insurance company
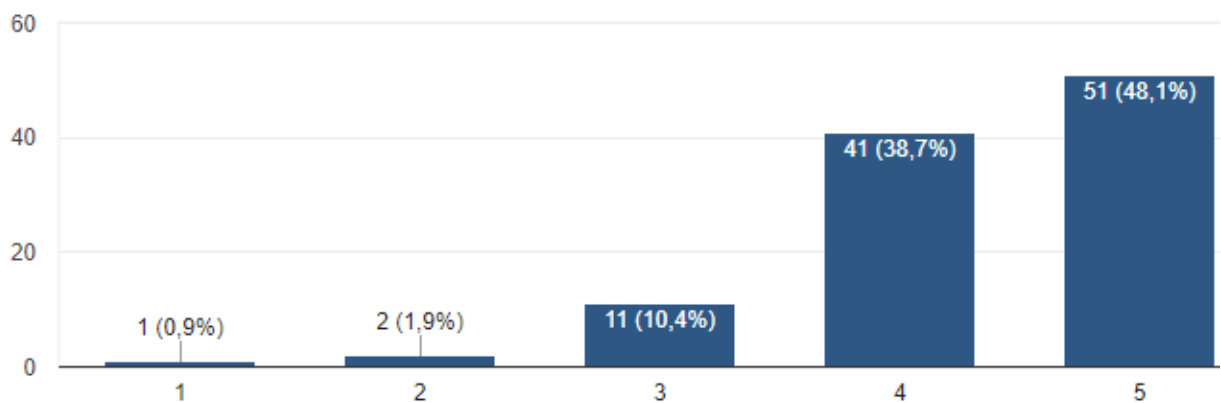
Diagram 22: Room for improvement of market research & risk identification

The evaluation of sample executives of the total effectiveness of their insurance company's risk management strategy that came from the combination of the four most important as well as the rest four factors is illustrated in diagram 23.

Define how effective, do you consider, is your Insurance company's Risk Management Strategy (or how effectively compines all the above factors)?
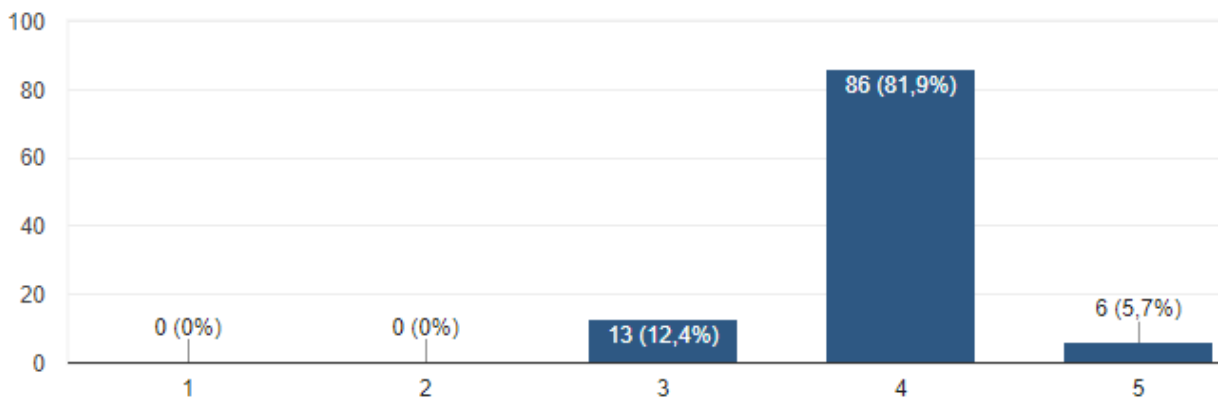
Diagram 23: Total effectiveness of insurance risk management strategy

In diagram 23, 86 out of 105 respondents consider that the level of combination of the decisive factors that result in an effective risk management strategy, corresponds to 4 = "much".

However, 57 out of 106 respondents (53.8%) (diagram 24) consider that there is still "very much" (level 5 of the Likert scale) room for improvement of the effective risk management strategy in their Greek insurance company.

Evaluate the room for improvement of the effective Risk Management Strategy of your insurance company
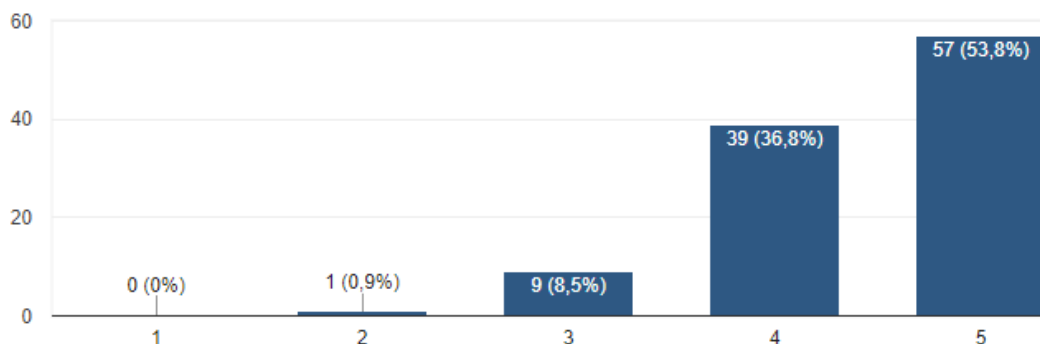
Diagram 24: Total room for improvement of the effective Ins. Risk Mngmt Strategy

Lastly, it is very interesting the fact that, according to sample respondents (diagram 25), Greek insurance companies are not complacent, but instead the 98.1% (103/105) of them, have plan for further development and improvement of its Risk Management Strategy in order to cope with the dynamic business environment and the new risks that emerge all the time.

In the near future, has your insurance company a plan for further development and improvement of its Risk Management Strategy?
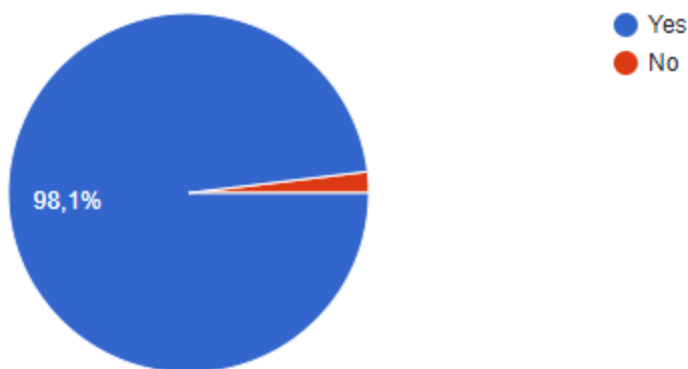
Diagram 25: Existence of plan for development and improvement of the Ins. Risk Mngmt Strategy

7.2.3. Bivariate (crosstabulation) or Multivariate Descriptive Analysis

In this section, some correlations between two or more variables will be examined to confirm or reject some claims resulting from univariate descriptive analysis as well as from international literature and articles.

- Work experience & expectations from effective insurance risk management strategy:

			How many years of work experience do you have in the risk management sector?					
			Less than one year	1-5	6-10	11-15	More than 15 years	Total
InsRiskMngmt_Expectations[a]	Reduction of financial losses	Count	0	8	23	34	28	93
		% within $InsRiskMngmt_Expectations	0,0%	8,6%	24,7%	36,6%	30,1%	
		% within Work_Experience	0,0%	61,5%	88,5%	94,4%	96,6%	
		% of Total	0,0%	7,5%	21,7%	32,1%	26,4%	87,7%
	Better allocation of resources	Count	0	1	17	28	22	68
		% within $InsRiskMngmt_Expectations	0,0%	1,5%	25,0%	41,2%	32,4%	
		% within Work_Experience	0,0%	7,7%	65,4%	77,8%	75,9%	
		% of Total	0,0%	0,9%	16,0%	26,4%	20,8%	64,2%
	Improvement in decision making	Count	2	7	12	30	26	77
		% within $InsRiskMngmt_Expectations	2,6%	9,1%	15,6%	39,0%	33,8%	
		% within Work_Experience	100,0%	53,8%	46,2%	83,3%	89,7%	
		% of Total	1,9%	6,6%	11,3%	28,3%	24,5%	72,6%
	Better communication with the stakeholders	Count	0	7	9	22	14	52
		% within $InsRiskMngmt_Expectations	0,0%	13,5%	17,3%	42,3%	26,9%	
		% within Work_Experience	0,0%	53,8%	34,6%	61,1%	48,3%	
		% of Total	0,0%	6,6%	8,5%	20,8%	13,2%	49,1%
Total		Count	2	13	26	36	29	106
		% of Total	1,9%	12,3%	24,5%	34,0%	27,4%	100,0%

Table 3: Work experience & expectations from effective insurance risk management strategy

In table 3, it is clear that 93/106 of respondents (87.7%) answered that "reduction of financial losses" is what they expect more from an effective insurance risk management strategy, and this expectation comes first in every category of work experience, except the category "less than one year" where the only two respondents - that work less than one year in the risk management sector – answered that "improvement in decision making" is their only expectation. The fact that these two respondents chose only one expectation, can be attributed to their lack of experience, otherwise is a good answer since "improvement in decision making" (as in the survey of Na Ranong & Phuenngam, 2009) comes second in executives expectations (72.6% of total) in almost all categories of work experience.

From table 3 can be assumed that work experience isn't correlated with expectations, since there are standard expectations that executives, specialized in insurance risk management and in every category of work experience, have. This assumption is verified from the X^2 test (chi-square) after collapsing of categories of "work experience" in order the percentage of cells with expected frequency less than 5, to reach the minimum level and so, the conclusions to be more reliable (tables 4-7). The X^2 test was conducted between "work experience" and the two highest expectations ("reduction of financial losses" and "improvement in decision making").

Count

		Reduction of financial losses		Total
		No	Yes	
WorkExp_New	Till 15 Years	12	65	77
	More than 15 Years	1	28	29
Total		13	93	106

Table 4: Crosstabulation between "work experience" and "reduction of financial losses"

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,884[a]	1	,089		
Continuity Correction[b]	1,866	1	,172		
Likelihood Ratio	3,559	1	,059		
Fisher's Exact Test				,108	,079
Linear-by-Linear Association	2,856	1	,091		
N of Valid Cases	106				

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 3,56.

Table 5: X^2 test of independence between "work experience" and "reduction of financial losses"

It can be hypothesized, from table 5, that since significance p = 0.089 > 0.05, the hypothesis H_0 (of no correlation between the two variables) cannot be rejected, and therefore, it can be verified that expectations and work experience are independent variables. The same conclusion emerged from the examination of the relationship between "work experience" and "improvement in decision making" (tables 6-7).

Count

		Improvement in decision making		Total
		No	Yes	
WorkExp_New	Till 15 Years	26	51	77
	More than 15 Years	3	26	29
Total		29	77	106

Table 6: Crosstabulation between "work experience" and "improvement in decision making"

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5,815[a]	1	,016		
Continuity Correction[b]	4,696	1	,030		
Likelihood Ratio	6,631	1	,010		
Fisher's Exact Test				,016	,012
Linear-by-Linear Association	5,760	1	,016		
N of Valid Cases	106				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 7,93.

Table 7: X^2 test of independence between "work experience" and "improvement in decision making"

Significance p = 0.016 > 0.05, therefore, the hypothesis H_0 of independence between the two variables, cannot be rejected.

- Work experience & factors of effective insurance risk management strategy

InsRiskMngmt_Determinants		How many years of work experience do you have in the risk management sector?					
		Less than one year	1-5	6-10	11-15	More than 15 years	Total
Communication and collaboration with other departments (Undewriting, Actuarial etc.)	Count	2	6	22	32	28	90
	% within $InsRiskMngmt_Determinants	2,2%	6,7%	24,4%	35,6%	31,1%	
	% within Work_Experience	100,0%	46,2%	84,6%	88,9%	96,6%	
	% of Total	1,9%	5,7%	20,8%	30,2%	26,4%	84,9%
Market research and identification of possible risks	Count	1	8	20	33	28	90
	% within $InsRiskMngmt_Determinants	1,1%	8,9%	22,2%	36,7%	31,1%	
	% within Work_Experience	50,0%	61,5%	76,9%	91,7%	96,6%	
	% of Total	0,9%	7,5%	18,9%	31,1%	26,4%	84,9%
Regulatory compliance (level of technical reserves etc.)	Count	2	7	14	26	24	73
	% within $InsRiskMngmt_Determinants	2,7%	9,6%	19,2%	35,6%	32,9%	
	% within Work_Experience	100,0%	53,8%	53,8%	72,2%	82,8%	
	% of Total	1,9%	6,6%	13,2%	24,5%	22,6%	68,9%
Effective fraud detection protocols (fraud experts etc.)	Count	0	7	19	31	24	81
	% within $InsRiskMngmt_Determinants	0,0%	8,6%	23,5%	38,3%	29,6%	
	% within Work_Experience	0,0%	53,8%	73,1%	86,1%	82,8%	
	% of Total	0,0%	6,6%	17,9%	29,2%	22,6%	76,4%
Proper balance of premium - level of risks, in order payment of claims and legitimacy to be ensured	Count	0	4	12	27	24	67
	% within $InsRiskMngmt_Determinants	0,0%	6,0%	17,9%	40,3%	35,8%	
	% within Work_Experience	0,0%	30,8%	46,2%	75,0%	82,8%	
	% of Total	0,0%	3,8%	11,3%	25,5%	22,6%	63,2%
Outsourcing (help of specialized in Risk Management audit firms)	Count	0	0	1	4	3	8
	% within $InsRiskMngmt_Determinants	0,0%	0,0%	12,5%	50,0%	37,5%	
	% within Work_Experience	0,0%	0,0%	3,8%	11,1%	10,3%	
	% of Total	0,0%	0,0%	0,9%	3,8%	2,8%	7,5%
Expertise and experience of executives in proper evaluation, prioritization and treatment of risks (loss retention, loss reduction, loss prevention, transfer of risks - reinsurance)	Count	1	7	15	30	26	79
	% within $InsRiskMngmt_Determinants	1,3%	8,9%	19,0%	38,0%	32,9%	
	% within Work_Experience	50,0%	53,8%	57,7%	83,3%	89,7%	
	% of Total	0,9%	6,6%	14,2%	28,3%	24,5%	74,5%
Support and commitment from top management	Count	1	3	11	27	17	59
	% within $InsRiskMngmt_Determinants	1,7%	5,1%	18,6%	45,8%	28,8%	
	% within Work_Experience	50,0%	23,1%	42,3%	75,0%	58,6%	
	% of Total	0,9%	2,8%	10,4%	25,5%	16,0%	55,7%
	Count	2	13	26	36	29	106
	% of Total	1,9%	12,3%	24,5%	34,0%	27,4%	100,0%

Table 8: Work experience and determinants of effective Ins. Risk Mngmt Strategy

Indicatively, table 8 depicts that almost all of the executives that have the highest experience (more than 15 years), consider "communication and collaboration with other departments" and "market research and risk identification" as fundamental factors for effective risk management (the same percentage 96.6% in both cases). On the other hand, in the case of "effective fraud detection protocols", which is the second more "popular" factor, the

percentage of respondents is higher in those with work experience 11-15 years (86.1%) than those with work experience more than 15 years (82.8%). An interpretation could be that older executives are sometimes more conservative than younger ones.

The examination of the independence between "work experience" and each one of the most significant factors (for example "risk identification" and "fraud detection protocols") was conducted through X^2 test (tables 9-12).

Count

| | | Market research and identification of possible risks | | Total |
		No	Yes	
WorkExp_New	Till 15 Years	15	62	77
	More than 15 Years	1	28	29
Total		16	90	106

Table 9: Crosstabulation between "work experience" and "market research and risk identification"

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4,225[a]	1	,040		
Continuity Correction[b]	3,067	1	,080		
Likelihood Ratio	5,321	1	,021		
Fisher's Exact Test				,064	,031
Linear-by-Linear Association	4,185	1	,041		
N of Valid Cases	106				

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 4,38.

Table 10: X^2 test of independence between "work experience" and "market research and risk identification"

From table 10 could be hypothesized that there is correlation between the two variables, since significance $p = 0.04 < 0.05$ and therefore, hypothesis H_0 (of independence of variables) is rejected.

Count		Effective fraud detection protocols (fraud experts etc.)		Total
		No	Yes	
WorkExp_New	Till 15 Years	20	57	77
	More than 15 Years	5	24	29
Total		25	81	106

Table 11: Crosstabulation between "work experience" and "fraud detection protocols"

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,891[a]	1	,345		
Continuity Correction[b]	,473	1	,492		
Likelihood Ratio	,933	1	,334		
Fisher's Exact Test				,445	,250
Linear-by-Linear Association	,883	1	,347		
N of Valid Cases	106				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 6,84.

Table 12: X^2 test of independence between "work experience" and "fraud detection protocols"

Table 12 on the other hand, shows that, since significance p = 0.345 > 0.05, the hypothesis H_0 cannot be rejected, and therefore can be assumed that fraud detection protocols are considered as a significant factor either way and the work experience does not affect this choice of executives.

- Examination of the relationship of variables "work experience", "evaluation of total effectiveness of company's insurance risk management strategy" and " evaluation of the room for improvement of the effective insurance risk management strategy" (diagram 26).
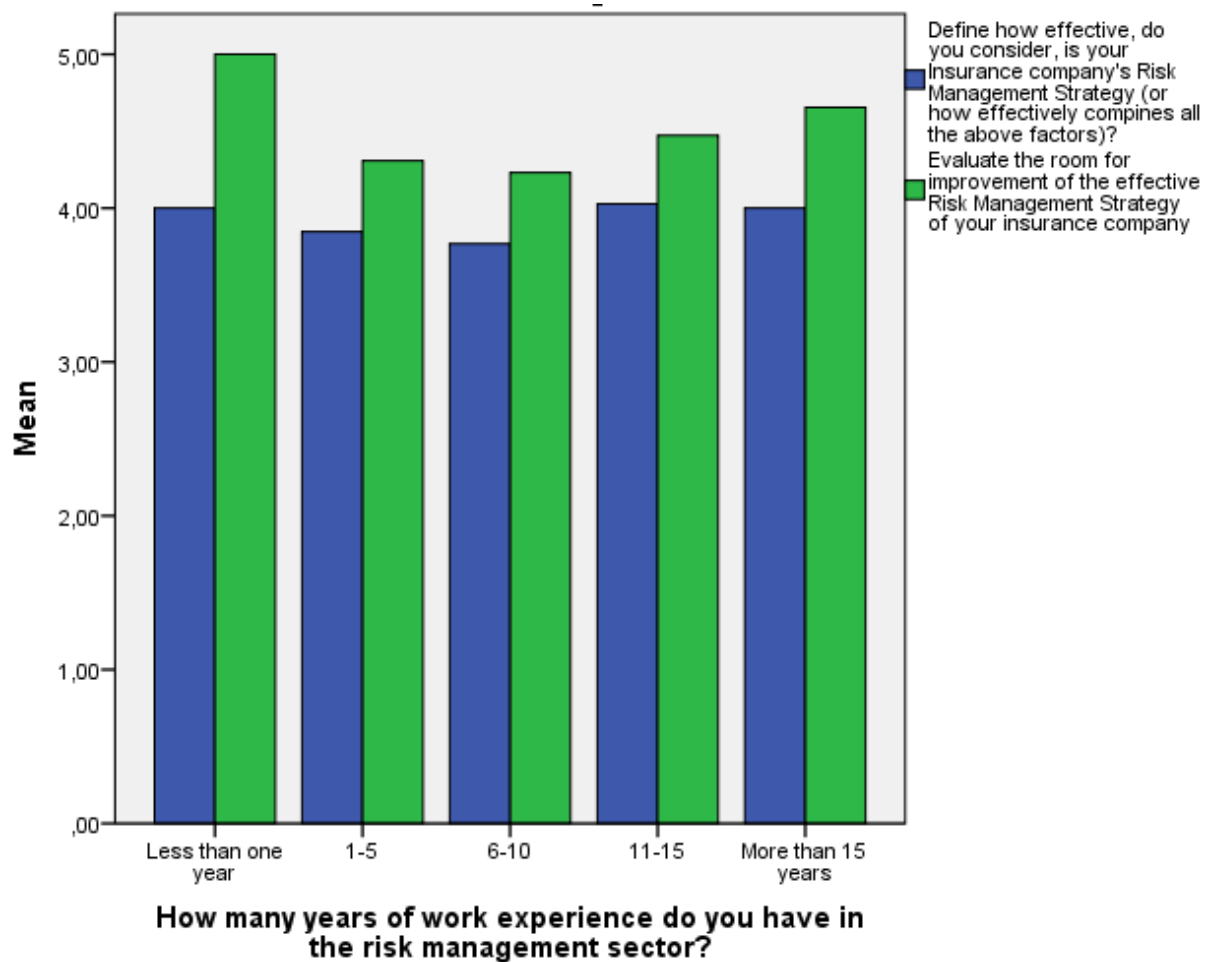
Diagram 26: Evaluation of total effectiveness and the room for improvement of the Ins. Risk Mngmt Strategy in relation to work experience

Generally, according to diagram 26, Greek sample respondents evaluate that their insurance company's risk management strategy is very effective, since it sustained during the big crisis of 2008, but there is still plenty of room for improvement which generally is considered bigger as higher is the work experience. An assumption for this ascertainment is that executives with higher experience can explore more deeply and identify new improvement factors.

- Paired t-test analysis among factors of effective insurance risk management strategy (table 13).

	Mean		Paired differences	Sig. (2-tailed)
Communication	0.8491	Risk identification	0.000	1.000
		Regulatory compliance	0.16038	0.001
		Fraud protocols	0.08491	0.083
		Premium-risk balance	0.21698	0.000
		Outsourcing	0.77358	0.000
		Executives' expertise	0.10377	0.041
		Top management support	0.29245	0.000
Risk identification	0.8491	Regulatory compliance	0.16038	0.002
		Fraud protocols	0.08491	0.049
		Premium-risk balance	0.21698	0.000
		Outsourcing	0.77358	0.000
		Executives' expertise	0.10377	0.016
		Top management support	0.29245	0.000
Regulatory compliance	0.6887	Fraud protocols	-0.07547	0.131
		Premium-risk balance	0.05660	0.134
		Outsourcing	0.61321	0.000
		Executives' expertise	-0.05660	0.158
		Top management support	0.13208	0.004
Fraud protocols	0.7642	Premium-risk balance	0.13208	0.004
		Outsourcing	0.68868	0.000
		Executives' expertise	0.01887	0.672
		Top management support	0.20755	0.000
Premium-risk balance	0.6321	Outsourcing	0.55660	0.000
		Executives' expertise	-0.11321	0.007
		Top management support	0.07547	0.117
Outsourcing	0.0755	Executives' expertise	-0.66981	0.000
		Top management support	-0.48113	0.000
Executives' expertise	0.7453	Top management support	0.18868	0.000
Top management support	0.5566			

Table 13: Paired t-test analysis (results) among factors of effective Ins. Risk Mngmt Strategy

It is also confirmed by Table 13 that factors "communication & collaboration", "risk identification", "fraud detection protocols" and "expertise of executives" pointed out from the outset, are among the first in sample executives' preferences when questioned about the effective insurance risk management strategy. Also, it is observed that the significance regarding for example the pair communication – fraud protocols, is 0.083 > 0.05, which means that the difference in the average number of preferences with respect to these two factors is negligible, and the null hypothesis H_0 cannot be rejected, namely it is accepted that there is no statistical significant difference between the two means and therefore their equality could be hypothesized.

7.3 Multiple Linear Regression Analysis

At this point it was examined how the combination of more than two variables affected, namely was examined the linear relation of the independent variables with the dependent variable, as well as the significance of the regression coefficients, while retaining in the model the most significant ones.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,655[a]	,428	,314	,32636

Table 14: Multiple regression analysis, dependent variable: total effectiveness of Ins. Risk Mngmt Strategy

As can be seen from Tables 14 - 16, a linear model has been assessed, according to which the total effectiveness of insurance risk management strategy was defined as a dependent variable, and as independent variables were defined the factors of this effective strategy, according to executives' understanding, and the most important demographics. In Table 14, the "adjusted R Square" index, which is best suited to model quality control, is R^2adj. = 0.314 and states that 31.4% of the total variability of the dependent variable is interpreted by the changes of the independent variables, and the remaining 68.6% is due to other factors that are not countable by the regression, namely random ones. The standard error of the estimate is "Std. Error of the Estimate" = 0.32636 and multiplying it by two, the error margin is 0.65272 levels.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6,387	16	,399	3,748	,000[b]
	Residual	8,521	80	,107		
	Total	14,907	96			

Table 15: Variance analysis - Statistical significance test of the model, dependent variable: total effectiveness of the Ins. Risk Mngmt Strategy

In the analysis of variance (ANOVA) (Table 4.15), the examination of the statistical significance of R^2 was carried out which is 0.000 <0.05, namely it was tested if the dependent variable has a linear relationship with at least one of the independent variables. In this model there appears to be a linear relationship and accepted the alternative hypothesis (H_1) that at least one of the regression coefficients is other than zero.

From the control of the statistical significance of the coefficients (Table 16) it appears that the independent variables that have significance Sig. = p-value <0.05, and therefore have a significant effect on the model are "market research and risk identification" (that was highlighted during the descriptive analysis) (p = 0.000) and "strict adherence to risk management policy" (p = 0.039) which in descriptive analysis was highlighted as one of the two less "popular" supporting actions of the risk management policy (demographics). It is notable that this variable (strict adherence) emerged as an important one when the work experience in the model is "more than 15 years", while running the same model with work experience "11-15 years", the only independent variable that affects significantly the total effectiveness (dependent variable) is "market research and risk identification". In terms of multicollinearity (VIF), this was not a problem for any of the independent variables (namely the model does not give unnecessary and redundant information through the "repetition" of some variables - "weak" variables), since in all cases was less than 5. The Std. beta (0.449) of the most significant variable that is "market research and risk identification" means that there is a weak linear correlation (but the largest in the model) with the dependent variable (Table 16). The regression coefficient (B) of the "market research and risk identification" variable, which is also the largest in the model and equals to 0.261, is interpreted as follows: In an increase of "market research and risk identification" by one level, the level of total effectiveness of the insurance risk management strategy in the sample will increase 0.261 levels.

Coefficients[a]

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	2,377	,419		5,669	,000		
Reduction of financial losses	,017	,163	,013	,104	,918	,449	2,227
Better allocation of resources	-,141	,106	-,171	-1,334	,186	,436	2,294
Improvement in decision making	-,096	,100	-,108	-,953	,343	,555	1,802
Setting up Risk Management teams	,038	,128	,040	,294	,769	,395	2,531
Regular revision of Risk Management plans	-,189	,109	-,179	-1,739	,086	,672	1,487
Extensive and continuous training of Risk Officers	,027	,110	,032	,243	,808	,418	2,390
There is strict adherence to Risk Management Policy	,207	,099	,261	2,102	,039	,463	2,160
How strong do you consider is the communication & collaboration in your Insurance Company?	,004	,065	,008	,065	,948	,523	1,912
How strong do you consider is the market research and identification of possible risks in your Insurance Company?	,261	,072	,449	3,638	,000	,470	2,128
How strong do you consider is the regulatory compliance in your insurance company?	-,025	,065	-,036	-,380	,705	,812	1,231
How effective do you consider the fraud detection protocols in your insurance company?	,074	,061	,142	1,218	,227	,524	1,908
According to your professional opinion, there is proper balance of premium - level of risks in your insurance company?	,031	,058	,056	,539	,592	,664	1,506
How succeptible is your insurance company to outsourcing (help of specialized in Risk Management audit firms)?	,042	,048	,091	,875	,384	,663	1,507
In your insurance company, how strong do you consider the expertise and experience of executives in proper evaluation, prioritization and treatment of risks?	,071	,070	,113	1,013	,314	,574	1,743
How strong do you consider the support and commitment from top management in your insurance company?	-,004	,063	-,006	-,056	,956	,609	1,642
WorkExp_Over_15_Years	-,145	,086	-,168	-1,692	,095	,723	1,383

Table 16: Significant regression coefficients in relation to total effectiveness of the Ins. Risk Mngmt Strategy

Independent variables	Dependent variable		VIF (room for improvement)
	Total effectiveness of the Ins. Risk Mngmt Strategy	Room for improvement of Ins. Risk Mngmt Strategy	
	Std. beta	Std. beta	
Work exp. over 15 years	-0.168	0.075	1.181
Reduction of financial losses	0.013	0.004	1.955
Better allocation of resources	-0.171	0.021	2.127
Improvement in decision making	-0.108	-0.097	2.020
Setting up risk mngmt teams	0.040	-0.036	2.391
Revision of risk mngmt plans	-0.179	0.036	1.412
Training of risk officers	0.032	0.104	2.248
Strict adherence to risk mngmt policy	0.261*	-0.029	2.256
Communication & collaboration	0.008	0.234*	1.858
Risk identification	0.449***	0.278*	2.947
Regulatory compliance	-0.036	0.009	2.565
Fraud protocols	0.142	0.094	1.799
Premium-risk level balance	0.056	-0.011	2.700
Outsourcing	0.091	0.215**	1.363
Executives' expertise	0.113	0.044	2.656
Top management support	-0.006	0.177	2.087

Level of significance: * $p < 0.05$, ** $p < 0.01$, ***$p < 0.001$

Table 17: Regression Analysis - Summary table of correlations of independent and dependent variables

In Table 17 it also appears that if the dependent variable is the "room for improvement of Ins. Risk Mngmt Strategy" (R^2 adj = 0.526, and an Anova test was conducted with sig = 0.000), then the significant factors (which have high probability to be other than zero and therefore, to have linear relationship with the dependent variable) are: "communication & collaboration" with $p < 0.05$, "risk identification" with $p < 0.05$, and "outsourcing" with $p < 0.01$. The interpretation is that risk identification and communication that were highlighted as very important factors from the beginning of this analysis and from international bibliography (e.g. Carey, 2001; Na Ranong & Phuenngam, 2009), according to sample respondents, play also important role in the future improvement and development of the insurance risk management strategy. Furthermore, it is very interesting that the less popular factor "outsourcing" emerged

as a significant one to the variability of the dependent variable. As long as it takes the other independent variables, the fact that, from the multiple regression analysis, there is probability that they don't have linear relationship with the dependent variable, doesn't mean that they don't have any relationship. Each one of the independent variables may be strongly correlated with "total effectiveness of Ins. Risk Mngmt Strategy" or "room for improvement of the Ins. Risk Mngmt Str.", but the relationship could be curvilinear.

<div align="center">Coefficients[a]</div>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1,116	,330		3,379	,001		
	Evaluate the room for improvement of communication & collaboration in your insurance company	,254	,086	,251	2,964	,004	,645	1,551
	Evaluate the room for improvement of market research and risk identification in your insurance company	,391	,073	,459	5,352	,000	,627	1,594
	Evaluate the room for future improvement of outsourcing in your insurance company	,180	,054	,234	3,364	,001	,951	1,051

Table 18: Significance test of the regression coefficients, dependent variable: room for improvement of the effective Ins. Risk Mngmt Strategy

In Table 18 the partial correlation coefficients (std. Beta.) have been improved to a small extent (while Beta of "risk identification" has almost been doubled and R^2 adj. = 0.5136 has been improved a lot) after the introduction into our model of only the important factors that resulted from the above analysis. Similarly, in the case of the other dependent variable "total effectiveness of the Ins. Risk Mngmt Str.", the adj. $R^2 = 0.332$ has been slightly improved, but the only independent variable that was highlighted as significant is "risk identification", clearly pointing out that the independent variable "strict adherence to Risk Mngmt Policy" has direct relationship with "work experience over15 years".

Chapter 8

Conclusions and Suggestions

As mentioned in a previous section, insurance companies are financial organizations that their core business is about dealing with their clients' risks as well as with their own risks in a daily basis. Nevertheless, the great financial crisis of 2008 has revealed many weaknesses and vulnerabilities in the way these companies were handling their risks, resulting in the bankruptcy of many of them.

Effective risk management has emerged as the key to viability of every business (e.g. Carey, 2001; Galorath, 2006; Hasanali, 2002; Na Ranong & Phuenngam, 2009), especially of insurance companies. Identification, analysis, evaluation, treatment of risks, monitoring and review, and communication and consultation are fundamental steps of the risk management process (AIRMIC, et al., 2009).

So, starting from the factors that were components of the effective risk management strategy that emerged from time to time from other surveys, this dissertation aimed to confirm or reject these findings as the seasons, technologies, and requirements of the dynamic entrepreneurial environment are constantly changing. In addition, the emergence of new factors was another issue in the sense that this would be a motive for new research and debates in order for decision-makers to make good use of the results and work towards further upgrading of the effective insurance risk management strategy and hence the protection of insurance companies' customers' value.

Starting mostly from the work of Na Ranong & Phuenngam, (2009) regarding the questionnaire in the empirical part, the chosen determinants of the effective insurance risk management strategy are: *communication & collaboration, market research & identification, regulatory compliance, fraud detection protocols, premium – risk level balance, outsourcing, expertise of executives in proper handling of risks,* and *support – commitment from top management.*

From descriptive statistics, the four most important factors that came up are: *communication & collaboration (90/106 respondents), risk identification (90/106), fraud protocols (81/106) and expertise of executives (79/106).*

From univariate analysis (crosstabulation) came up that work experience is independent from the above factors except "risk identification" where it seems that the strongest the work experience is, the more this factor is highlighted by the executives. Otherwise, these factors are too important to be ignored by any executive with any work experience.

The multiple linear regression analysis model that was used highlighted the *"risk identification"* factor as the strongest one regarding "total effectiveness of the Ins. Risk Mngmt Strategy" without excluding the existence of other type of strong relationship (curvilinear) between the dependent variable and each one of the independent ones. Additionally, in total evaluation of the room for improvement of the insurance risk management strategy, the significant factors that came up though the multiple linear regression model are: *communication & collaboration, market research & risk identification* and *outsourcing.* Outsourcing is the new "element" that came up from the analysis, since only 8 Greek executives of the sample chose outsourcing as an important factor.

From the above it can be concluded that outsourcing is a "forgotten" factor by the Greek insurance companies, and they could pay more attention to it by being more open minded and not afraid of "foreigners" (which in some issues are more objective and realistic), in order to improve even more their risk management strategy.

In conclusion, risk management as the "backbone" of insurance companies', needs continuous evolvement and research as constantly evolving are the risks of the business environment.

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Additional Statistics from Google Forms

How strong do you consider is the regulatory compliance in your insurance company?
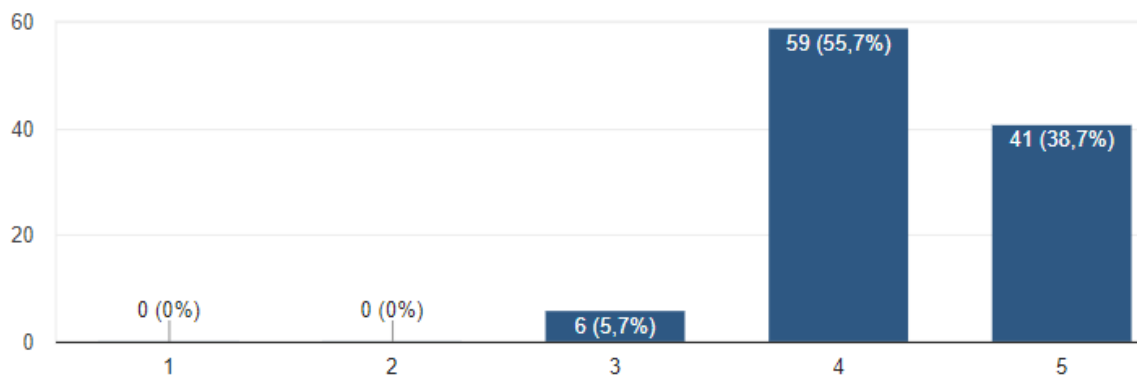
106

How effective do you consider the fraud detection protocols in your insurance company?

104

According to your professional opinion, there is proper balance of premium - level of risks in your insurance company?

105

1	0 (0%)
2	3 (2,9%)
3	15 (14,3%)
4	63 (60%)
5	24 (22,9%)

How succeptible is your insurance company to outsourcing (help of specialized in Risk Management audit firms)?

105

1	6 (5,7%)
2	32 (30,5%)
3	51 (48,6%)
4	13 (12,4%)
5	3 (2,9%)

In your insurance company, how strong do you consider the expertise and experience of executives in proper evaluation, prioritization and treatment of risks?

104

1	0 (0%)
2	2 (1,9%)
3	8 (7,7%)
4	58 (55,8%)
5	36 (34,6%)
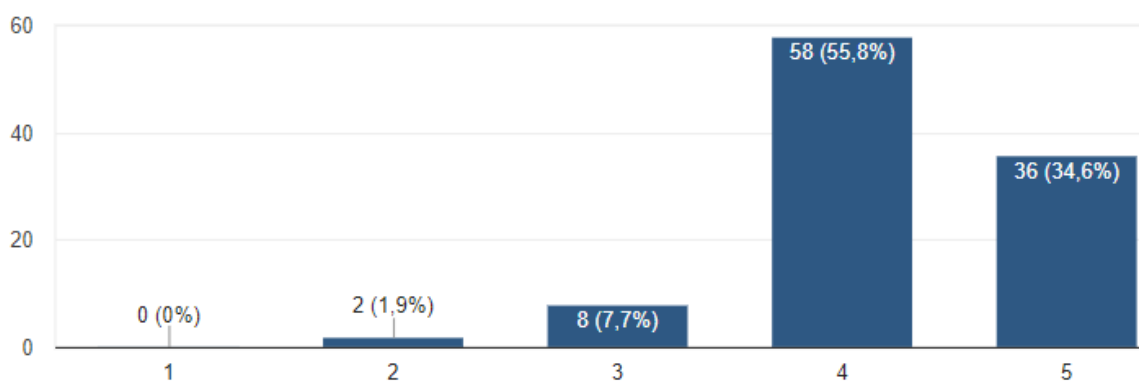
How strong do you consider the support and commitment from top management in your insurance company?
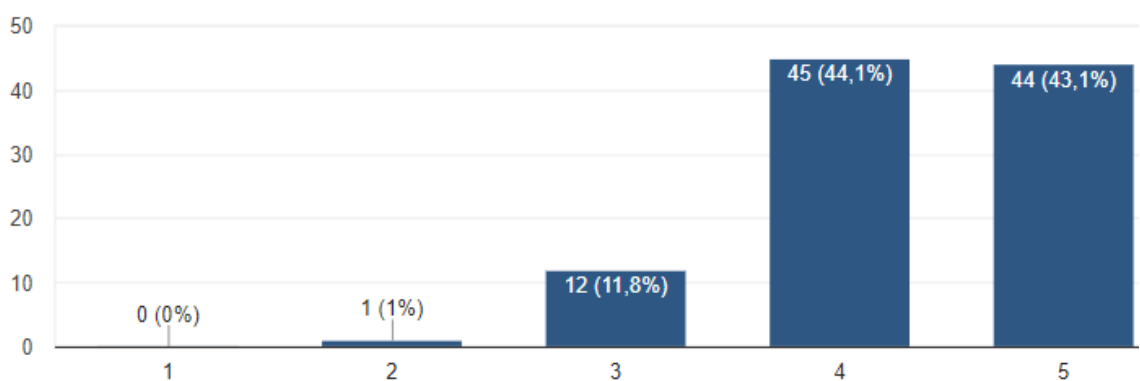
105

In your insurance company, how much room do you consider that there is, for more consistent future regulatory compliance?
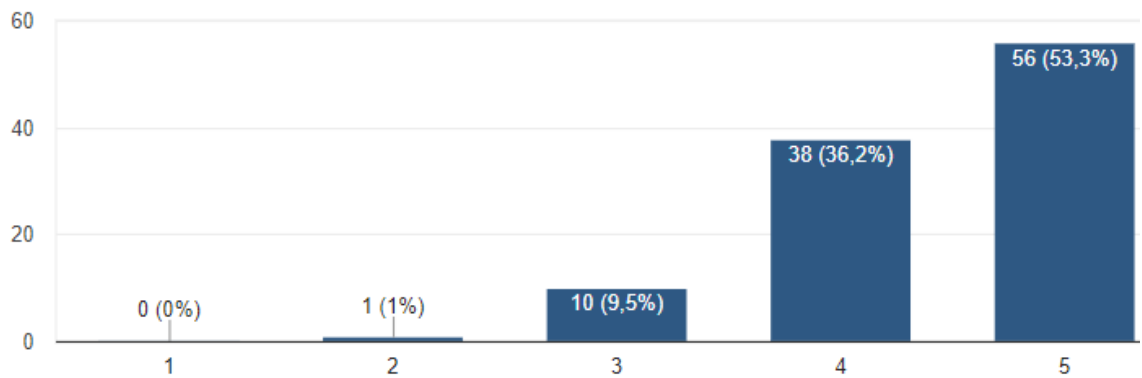
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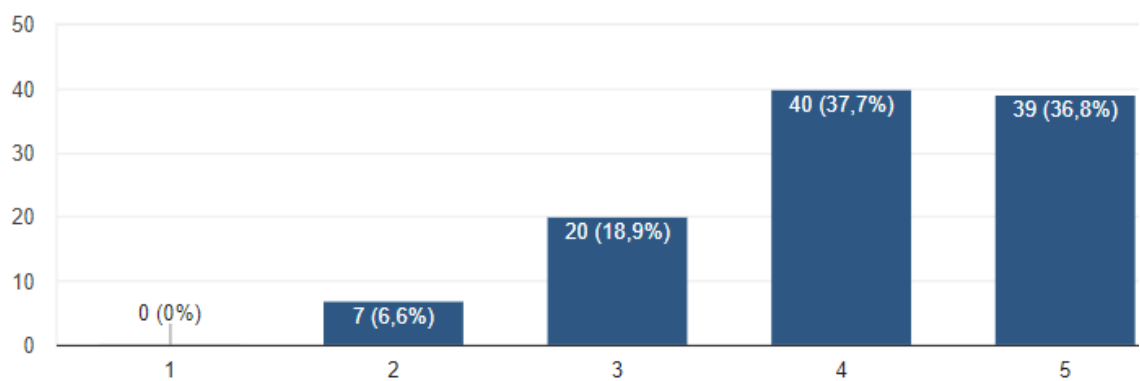
Evaluate the room for improvement of balance between premium and level of risks in your insurance company
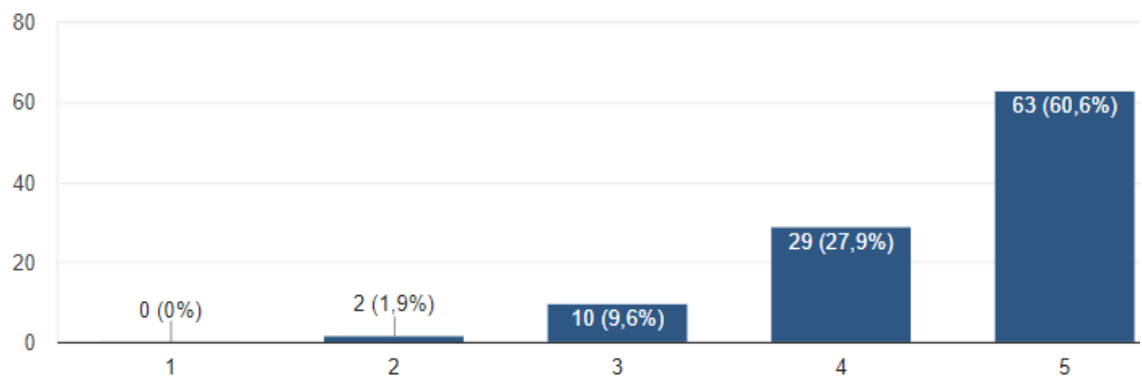
102

Evaluate the room for future improvement of expertise and experience of risk executives in your insurance company
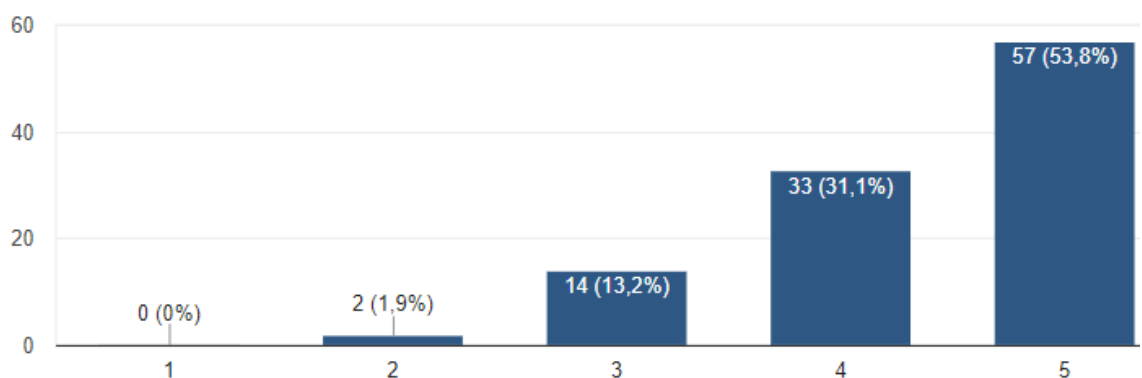
105

Evaluate the room for future improvement of support and commitment from top managent in your insurance company
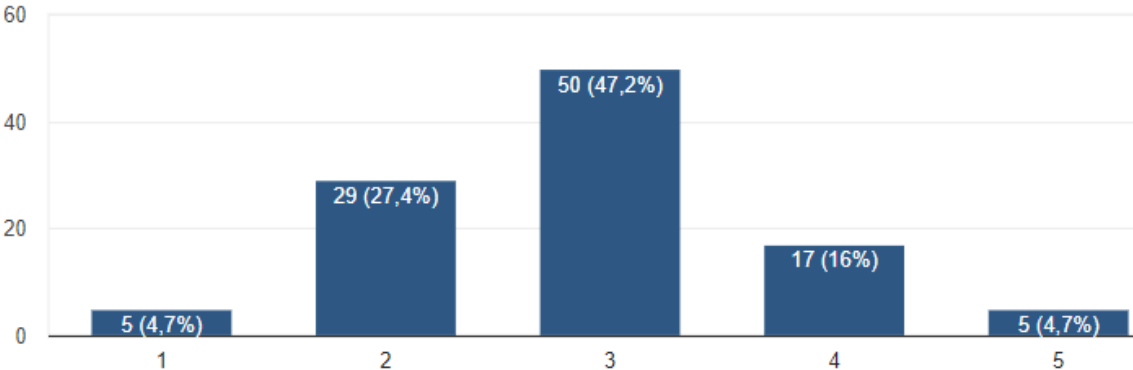
104

Evaluate the room for future improvement of fraud detection protocols in your insurance company

106

Evaluate the room for future improvement of outsourcing in your insurance company

106

QUESTIONS   ANSWERS   106

Section 1 of 4

Risk Management Strategy of Insurance Companies

Dear Sir/Madam,

My name is Kotsampasi Stergiani and I' m a student of the Postgraduate Studies Program of Enterprise Risk Management (the MSc is in English language) at the Open University of Cyprus. In my dissertation titled "risk management strategy of insurance companies and global financial crisis, a study focusing on insurance companies globally and in Greece ", a study is conducted on the econometric analysis of the factors that determine the level of the effective risk management strategy of insurance companies in Greece. The questionnaire is addressed to Top Executives of Insurance Companies that deal with Risk Management.

Your participation is voluntary and anonymous. Your answers are confidential and will be used exclusively for research and academic purposes.

Your participation and honest answers are considered necessary to deliver reliable scientific conclusions. The questionnaire completion time is about 10 minutes. Answer the questions by selecting or filling in the information you will be asked for. Thank you in advance for your participation and the time you will have.

I am responsible for the collection and processing of the questionnaires, and for any queries or clarifications please contact me with the following contact details:

Kotsampasi Stergiani
Email: kotsampasi_st@outlook.com

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General Information

How many years of work experience do you have in the Risk Management Sector? *

◯ Less than one year

◯ 1-5

◯ 6-10

◯ 11-15

◯ More than 15 years

What do you expect from an effective Insurance Risk Management Strategy (one or more answers)?

☐ Reduction of Financial losses

☐ Better allocation of resources

☐ Improvement in decision making

☐ Better communication with the stakeholders

☐ Other ...

How the Risk Management Policy of your Insurance Company is supported (one or more answers)?

☐ Setting up Risk Management teams

☐ Regular revision of Risk Management plans

☐ Extensive and continuous training of Risk Officers

☐ Front line employees can easily have access to executives of higher hierarchy in order to refer problems and detecti...

☐ There is strict adherence to Risk Management Policy

☐ Other ...

Section 3 of 4

Determination of the effective Insurance Risk Management Strategy

Which of the following factors do you consider decisive for an effective Insurance Risk Management Strategy (one or more answers)?

☐ Communication and collaboration with other departments (Undewriting, Actuarial etc.)

☐ Market research and identification of possible risks

☐ Regulatory compliance (level of technical reserves etc.)

☐ Effective fraud detection protocols (fraud experts etc.)

☐ Proper balance of premium - level of risks, in order payment of claims and legitimacy to be ensured

☐ Outsourcing (help of specialized in Risk Management audit firms)

☐ Expertise and experience of executives in proper evaluation, prioritization and treatment of risks (loss retention, los...

☐ Support and commitment from top management

☐ Other ...

How strong do you consider is the communication & collaboration in your Insurance Company?

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

How strong do you consider is the market research and identification of possible risks in your Insurance Company?

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

How strong do you consider is the regulatory compliance in your insurance company?

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

How effective do you consider the fraud detection protocols in your insurance company?

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

According to your professional opinion, there is proper balance of premium - level of risks in your insurance company?

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

How succeptible is your insurance company to outsourcing (help of specialized in Risk Management audit firms)?

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

In your insurance company, how strong do you consider the expertise and experience of executives in proper evaluation, prioritization and treatment of risks?

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

How strong do you consider the support and commitment from top management in your insurance company?

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Define how effective, do you consider, is your Insurance company's Risk Management Strategy (or how effectively compines all the above factors)?

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Room for future improvement of the effective Insurance Risk Management Strategy

In the near future, has your insurance company a plan for further development and improvement of its Risk Management Strategy?

○ Yes

○ No

Evaluate the room for improvement of communication & collaboration in your insurance company

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Evaluate the room for improvement of market research and risk identification in your insurance company

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

90

In your insurance company, how much room do you consider that there is, for more consistent future regulatory compliance?

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Evaluate the room for improvement of balance between premium and level of risks in your insurance company

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Evaluate the room for future improvement of expertise and experience of risk executives in your insurance company

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Evaluate the room for future improvement of support and commitment from top managent in your insurance company

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Evaluate the room for future improvement of fraud detection protocols in your insurance company

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Evaluate the room for future improvement of outsourcing in your insurance company

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much

Evaluate the room for improvement of the effective Risk Management Strategy of your insurance company

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very much