



End of Studies Project

Topic :

**Setting up a risk management system of the Motor
Business line: Advantages and limits**

**Practical case study: Risk mapping of the Motor
Business line within SAA**

Presented and defended by :

BELGACEM MARIA

Supervised by :

M. WALID BEN MESSAOUD

Student belonging to :

The National Insurance Company SAA

DEDICATION

I dedicate this work as a testimony of my love for the people who are dear to my heart:

To my mother, Messaouda to whom I owe what I am, may she find here the fruit of her sacrifice and a testimony of my gratitude and my great love

To my father Said, for his father's love, his sacrifices, and his presence

To the love of my life Yanis, no dedication could express my deep affection and my immense gratitude for all the encouragement and support he has given me.

To my dear brothers and sisters for their presence and their support

To all my colleagues from the I.F.I.D Algerians and Tunisians with whom we have shared good times throughout these two years

To all those who are dear to me ...

ACKNOWLEDGMENTS

I would like to express my deep gratitude to the administration and to the entire I.F.I.D. faculty for ensuring the smooth running of my training.

I would like to express my deepest thanks to my supervisor, Mr. Walid BENMESSAOUD, for having kindly conducted this thesis with patience and encouragement. I especially want to thank him for all of his guidance, support and many tips that he has never stopped giving me throughout my work.

I would like to warmly thank the Head of the Motor insurance division Mr. Hamza ARBANE for his assistance in every step of this work, his patience, motivation, and mostly for believing in our abilities. It has been a great pleasure to work and learn valuable information with such a positive cheerful encouraging man

I would like to thank all the staff of the Motor division, their availability and their listening, which served me a lot during the preparation of this thesis

I acknowledge and thank all the staff members who took part in this study, especially Mr. MEZIANI head of the control structure for his extreme kindness and valuable comments , and Mr. AIOUAZ who welcomed our presence in his agency and helped organizing our study

Finally, I wish to express appreciation and thanks to the members of the jury who accepted to evaluate, examine, and grade my work.

ABSTRACT

All the engaged regulatory changes in the past few decades have emphasized the necessity of implementing a risk management system within insurance companies

In this context, risk mapping has proved to be one of the most suitable tools when it comes to managing risks systematically. The aim of our study is to illuminate how risk mapping can bring value to insurance companies by enhancing the decision making and increasing efficiency. In order to achieve that, in the first part, we will ensure a better understanding of this discipline by defining the different risk concepts, the evolution of risk management, and its necessity within the insurance company. We will also give a detailed description of the adopted approach and methodology in risk mapping

In the second part, which is purely practical, we will try to set up a risk mapping for the Motor insurance activity. First, we will present the company SAA as well as the specificities of the chosen business line then proceed with our mapping

Key words: risk management, risk mapping, systematically

Résumé

Tous les changements réglementaires engagés au cours des dernières décennies ont souligné la nécessité de mettre en place un système de gestion des risques au sein des compagnies d'assurance. Dans ce contexte, la cartographie des risques s'est avérée être l'un des outils les plus adaptés pour gérer systématiquement les risques. L'objectif de notre étude est d'éclairer comment la cartographie des risques peut apporter de la valeur aux compagnies d'assurance en améliorant la prise de décision et en augmentant l'efficacité.

Pour y parvenir, dans une première partie, nous assurerons une meilleure compréhension de cette discipline en définissant les différents concepts de risque, l'évolution de la gestion des risques et sa nécessité au sein de la compagnie d'assurance. Nous donnerons également une description détaillée de l'approche et de la méthodologie adoptées dans la cartographie des risques. Dans une seconde partie purement pratique, nous tenterons de mettre en place une cartographie des risques pour l'activité d'assurance automobile. Dans un premier temps, nous présenterons la société SAA ainsi que les spécificités de l'agence choisie puis nous procéderons à notre cartographie

LISTE OF FIGURES

Figure 1 : COSO 1992 VS COSO 2004.....	11
Figure 2: Principles, framework and process	12
Figure 3 : The Economic balance sheet	16
Figure 4: Solvency II pillars	16
Figure 5: Solvency capital requirements modules	18
Figure 6: ORSA Process	19
Figure 7: FERMA risk diagram.....	20
Figure 8: Risks according to IFACI.....	21
Figure 9: The Three Lines of Defense Model	29
Figure 10: Granularity levels.....	33
Figure 11: Combined approach	36
Figure 12: Risk mapping process	38
Figure 13: Risk Matrix.....	44
Figure 14: Risk Radar	44
Figure 15: SAA Market share 2019	51
Figure 16: SAA Market shares by Insurance business line	51
Figure 17: SAA growth VS Algerian Market growth.....	52
Figure 18: SAA turnover evolution	53
Figure 19: Portfolio structure 2019 VS 2018	53
Figure 20: Motor Portfolio structure (mandatory and non-mandatory)	55
Figure 21: Portfolio structure by segment	56
Figure 22: Motor Portfolio structure by guaranty.....	56
Figure 23: Risk mapping stages.....	62
Figure 24: Control elements matrix	67
Figure 25: Net risk Matrix.....	67
Figure 26: Gross risk matrix.....	79
Figure 27: Control elements matrix	80
Figure 28: Net risk matrix	81

LISTE OF TABLES

Table 1: Comparison between traditional and integrated approach.....	9
Table 2: Solvency I VS Solvency II.....	15
Table 3: Top down VS Bottom up.....	35
Table 4: The frequency measurement scale.....	40
Table 5: The impact measurement scale.....	41
Table 6: mastery elements scale.....	42
Table 8:Motor Portfolio structure(2019 VS 2018).....	55
Table 9: Frequency measuring scale.....	64
Table 10: Frequency measuring scale.....	64
Table 11: Gross risk matrix.....	65

LISTE OF ABBREVIATIONS

Abbreviation	Meaning
AMF's	Financial Markets Regulator
BSCR	Basic Solvency Capital Requirement
CEIOPS	Committee of European Insurance and Occupational Pension Supervisors
COSO	The 'Committee of Sponsoring Organizations of the Tredway Commission'
ERM	Entreprise risk management
FERMA	Federation of European Risk Management Associations
IFACI	I' Institute of Internal Auditors
IFRS	International financial reporting standards
ISO	The International Organization for Standardization
MCR	Minimum Capital Requirement
ORSA	Own Risk and Solvency Assessment (ORSA)
SCR	Solvency Capital Requirement

CONTENTS

GENERAL INTRODUCTION.....	1
PART ONE : THEORETICAL PART	4
CHAPTER I: RISK MANAGEMENT BACKGROUND.....	6
SECTION I: ENTREPRISE RISK MANAGEMENT FRAMEWORK	7
SECTION II: THE REGULATORY FRAMEWORK OF RISK MANAGEMENT: SOLVENCY II DIRECTIVE	13
SECTION III: MAIN RISKS TO BE CONSIDERED IN ERM.....	20
CONCLUSION	24
CHAPTER II: RISK MAPPING AS A RISK MANAGEMENT TOOL	26
SECTION I: RISK MAPPING BACKGROUND.....	27
SECTION II: KEYS TO SUCCESSFUL MAPPING	31
SECTION III: RISK MAPPING IMPLEMENTATION METHODOLOGY.....	37
CONCLUSION.....	46
PART TWO:PRACTICAL CASE STUDY	47
CHAPTER III: FRAMEWORK AND METHODOLOGY OF THE STUDY	49
SECTION I: PRESENTATION OF THE STUDY FRAMEWORK	50
SECTION II: METHODOLOGY OF DATA COLLECTION AND CHOICE OF MAPPING ..	58
SECTION III: THE ADOPTED APPROACH IN THE RISK MAPPING OF THE MOTOR INSURANCE BUSINESS LINE.....	62
CONCLUSION.....	70
CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA	72
SECTION 1: RISK IDENTIFICATION.....	73
SECTION II: RISK EVALUATION	75
SECTION III: ACTION PLAN.....	82
CONCLUSION.....	98
GENERAL CONCLUSION	99

GENERAL

INTRODUCTION

General Introduction

Nowadays, all insurance companies are called to monitor and manage their risks effectively considering the increasing uncertainty of the environment where they operate which, remains subject to multiple catastrophic events that can put their survival at stake.

The activity of insurance is highly focused on managing risks of others. However, insurers themselves are also exposed to a variety of risks associated with the nature of their activity, in particular to the reversal of the production cycle that characterizes the insurance business.

In this context, managing risks in the insurance industry has become a necessity that cannot be ignored for achieving success in competitive markets, therefore, the risk management function within an insurance company occupies primordial role, making it possible to detect the possible threats and assess their severity on the activity in order to put in place strategies to mitigate them.

As a result, the solvency of companies and their risk management have become a central concern of all stakeholders: managers and shareholders on the one hand, and supervisory bodies on another.

The solvency II directive comes to enhance this aspect, and that is by imposing certain qualitative requirements in order to encourage insurance companies to opt for an "Enterprise Risk Management" (ERM) strategy so that their risks can be managed systematically.

Risk mapping, a tool used by insurers in the identification, assessment and management of risk, not only shapes the first step in the Enterprise Risk Management (ERM) process ; but can also serve as the primary risk management process for companies with an undeveloped risk management system.

The objective of this thesis is to design a tool that acts in anticipation rather than protection. The aim is to set up a risk mapping of the Motor division in order to present, in a practical way, the hierarchy of risks within this business line and help prevent failures and ensure permanent monitoring.

The fundamental restructuring that the company is engaging to keep up with the continuous changes in its environment shows the attention of its managers to manage their risks systematically and holistically. That is what motivates mainly our choice in addition to the importance of the Motor business line in our company's portfolio

Based on the previous, the present thesis attempts to answer the following problematic: « *What are the risks inherent to the Motor division? What is the adopted approach to be followed to set up an effective risk management system and risk mapping of the Motor business line in order to create value for the insurance company? And what are the advantages and the limits of this tool? »*

This problematic leads us to ask the following questions:

- *What is the criticality of these risks*
- *What is the performance of the control elements in mitigating these risks?*
- *What strategies should be put in place to face these risks?*

To be able to deal with this topic according to a methodical sequence, our thesis will be structured around two parts. A theoretical part made up of two chapters, in which we will expose the concepts of risk management, ERM, and risk mapping.

The second part will be devoted to a practical aspect, in order to establish a risk mapping of the Motor division. In this second part, we will also present our company SAA as well as the specificities of the Motor business line, expose the methodological framework for the development of risk mapping and suggest an action plan which will depend on the obtained results.



PART ONE :
THEORETICAL PART

CHAPTER I :

RISK

MANAGEMENT

BACKGROUND

CHAPTER I: RISK MANAGEMENT BACKGROUND

The risk-oriented management approach is becoming more and more essential in the insurance field given the increasing complexity and the growing interdependence between the different risks.

This approach includes a set of means, behaviors, and procedures allowing the treatment of all the risks that the company faces in order to strengthen its value and improve its ability to achieve its objectives.

In order to ensure adequate risk management and to respect the principles of good governance, insurance companies must have two lines of defense; one concerning internal bodies (the risk management unit, audit and internal control) and the other relating to external measures (mainly regulations and supervisory authorities).

In this context, any insurance company is required to define its appetite for the risks to which it is exposed in order to achieve and pursue the strategic objectives of its activity.

In this first chapter, we will deal in the first section with the general framework of Enterprise Risk Management (ERM): its definition and basic concepts, and in a second one, we will talk about the regulatory framework of the ERM.

The third section will deal with the main risks to be taking into account when speaking about insurance companies

SECTION I: ENTREPRISE RISK MANAGEMENT FRAMEWORK

This first section is reserved to provide a general understanding of the variables that intervene in ERM. First, we will start by illuminating the risk concept from different aspects; then we will speak of the evolution of risk management. Finally, we will procure a brief presentation of the existing references that must be taken into account when it comes to implementing an effective enterprise risk management in insurance companies.

1. Risk concept

As risk management is being constantly developed through time, several definitions of risk have been given, but no unique or common definition has been agreed of until the day.

According to The International Organization for Standardization, risk can be defined as: *“the effect of uncertainty on objectives; it is the consequences of an event and the associated likelihood of that event”*

While the Financial Markets Regulator’s reference AMF considers that *“risk represents the possibility of an occurring event and the consequences of which could affect people, assets, the environment, the company's objectives or its reputation”*

In 2004, The 'Committee of Sponsoring Organizations of the Treadway Commission COSO defined risk as: *“the possibility that an event will occur and adversely affect the achievement of objectives”*

According to these references, it would be more effective if these risks are apprehended according to at least two dimensions: on one hand, based on the notion or the concept of frequency, probability and on the other hand, based on the consequence or the impact on organizations, individuals or goals. Only the combination of these two components can reasonably estimate the level of risk.

The most important thing that must be realized about risk is the fact that it can represent either a threat or an opportunity, the word risk itself contains two key ideas: uncertainty and outcomes.

2. Risk and uncertainty

According to Chapman and Ward (1997), all projects are risky; the zero-risk type of project should not be pursued. In order for companies to avoid potential disasters that might put its survival at stake, effective risk management must be put in place so that a more comprehensive understanding of risk nature is guaranteed and therefore allows seizing opportunities for advantageous investments, which might otherwise be rejected as too risky.

Risk and uncertainty are distinguished by both Bussey (1978) and Merrett and Sykes (1983); a decision is judged subject to risk if a set of possible outcomes exists, and determined probabilities are attached to them while when speaking of uncertainty the difference is that probabilities are not known in advance.

3. The evolution of Risk management

Risk management can be defined as: *“any set of actions taken by individuals or corporations in an effort to alter the risk arising from their business”*(Merna and Smith, 1996, p 40).

Handy (1999) claims that *“Risk management is not a separate activity from management, it is management...predicting and planning allows prevention...reaction is a symptom of poor management”*.

For decades, risk management function was taken seriously within companies, it is known now to be one of the most exciting and important aspects in managing investments in general and assets and liabilities in particular, in addition to strategic business and project levels.

The birth of risk management has appeared with the idea of chance and fortune, which existed in the most primitive cultures and developed through time with the appearance of insurance companies and the quantitative assessment in 1970s, methodologies and processes, quantitative analysis in 1980s and the introduction of probability to it in 1990.

The main differences between the traditional approach to the risk management process and ERM integrated process are presented in the table below:

Table 1: Comparison between traditional and integrated approach

Traditional approach	Integrated approach
Limited influence on strategy	Cooperation with an organization’s strategic business plans
Risk perceived in organizational units, only on operational levels	Commitment of the highest-ranking management
Reluctance to risk taking; a passive approach to risk, static management	Readiness for risk, an active approach to risk,
A fragmentary view of risk, perceived only inside an organization	An integrated, holistic view of risk, taking into account also its external aspects
Risk management as orientation to loss avoidance	Risk management as a process increasing an entity’s value
Random and accidental risk assessment and analysis (static process)	Risk assessment as a continuous process (a dynamic process)
Incoherent information system	Coherent, consolidated information
Lack of communication in an organization within the scope of risk	Open communication in the matter of risk management
Lack of division of responsibilities and competences within the range of risk management and control	Responsibility clearly connected with a given level of risk management (assigning individual risk types to the so-called risk owners being in charge of them)

Source: Creating value in a volatile economy, 2009; Machowiak, Staniec, 2007, p. 14; Zastawa, 2007.

Thanks to ERM, a comprehensive framework that allows the achievement of objectives according to a consistent management approach is now available; and a tight alignment between risk appetite and business strategies is guaranteed.

4. Implementing ERM

A single coordinated program is highly recommended when speaking about managing risk and pursuing opportunity. Enterprise risk management is a wide and complex concept that looks up into every small detail of the organization’s activity and since the practice of ERM is

still new, a variety of definitions have been offered by different specialists, all of which highlight and prioritize different aspects of ERM.

The Casualty Actuarial Society, 2003 defines ERM as: *“the discipline, by which an organization in any industry assesses, controls, exploits, finances, and monitors risk from all sources for the purpose of increasing the organization’s short and long term value to its stakeholders”*

ISO 31000 standard states: *“risk management refers to coordinated activities to direct and control an organization with regard to risk.”*

Therefore our own developed understanding of ERM that it represents a process that identifies and forecast the significance of major risks faced by the company, and aims to address them in a systematic and a well-coordinated plan, starting by implementing the plan, holding key individuals responsible for managing critical risks, according to the scope of their responsibilities.

5. Existing ERM references

Commonly the lack of a standard ERM definition is considered as a source of confusion; particularly in case of a company that is looking to set up an ERM framework. Therefore, each organization must adopt a suitable ERM definition and framework in adequacy with the complexity of its activity.

5.1. The COSO reference

Two decades ago and in an attempt to help organizations and other entities assessing and enhancing their internal control, an internal control-integrated framework was released by COSO in 1992, this framework was quickly adopted by enterprises to better control their activities in order to achieve their objectives.

Years later, the risk management integrated framework was released by COSO in 2004 as the consequence of the increasing need for a framework that identifies, assesses and manage risk effectively. Both of the COSO frameworks used, a three-dimensional model as a matrix shaped into the form of a cube with a front (1st horizontal rows dimension), top (2nd slices) and side (3rd vertical columns).

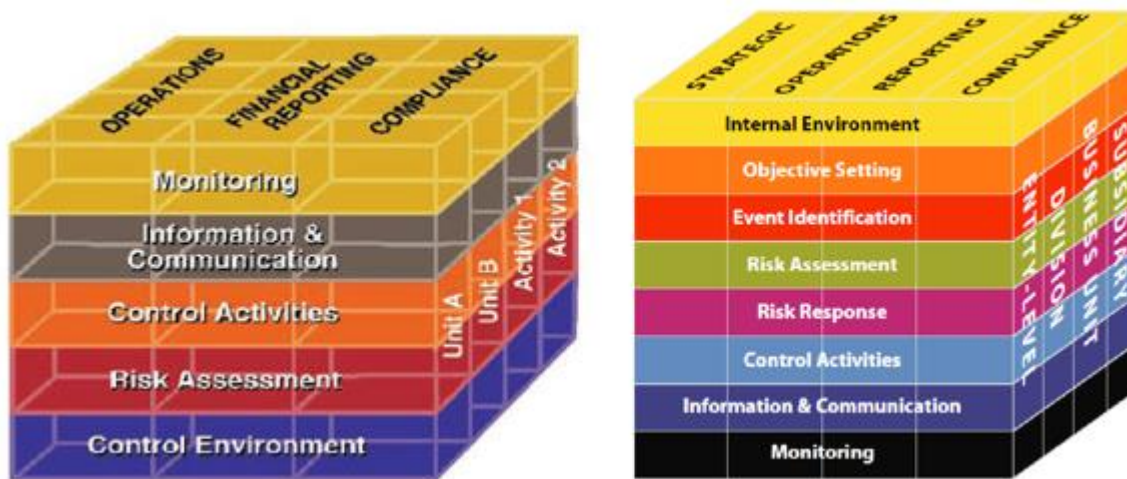
Starting by the first dimension (the front), the components of the risk management process are represented by horizontal rows. The first COSO framework had only five components,

encompassing each of the control environment, risk assessment, control activities, information and communication and monitoring,; while the second one (2004), added three new components, which are objective setting, event identification and risk response for effective risk management.

Moving to the second dimension (the top) which is the slices and by which the entity's objectives are represented, the internal control framework (1992) had only three entity objectives, which are respectively operations, financial reporting and compliance. COSO ERM (2004) is determined to be more effective in four categories of after adding strategic objectives.

The last dimension is the side vertical columns representing the organizational units of the entity, COSO 2004 framework is applied to multiple levels of the organization, from entity level to individual division, business unit and subsidiary; while the 1992 framework was applied into one function only.

Figure 1 : COSO 1992 VS COSO 2004



Source: Enterprise Risk Management Integrated Framework Executive Summary September 2004, P5

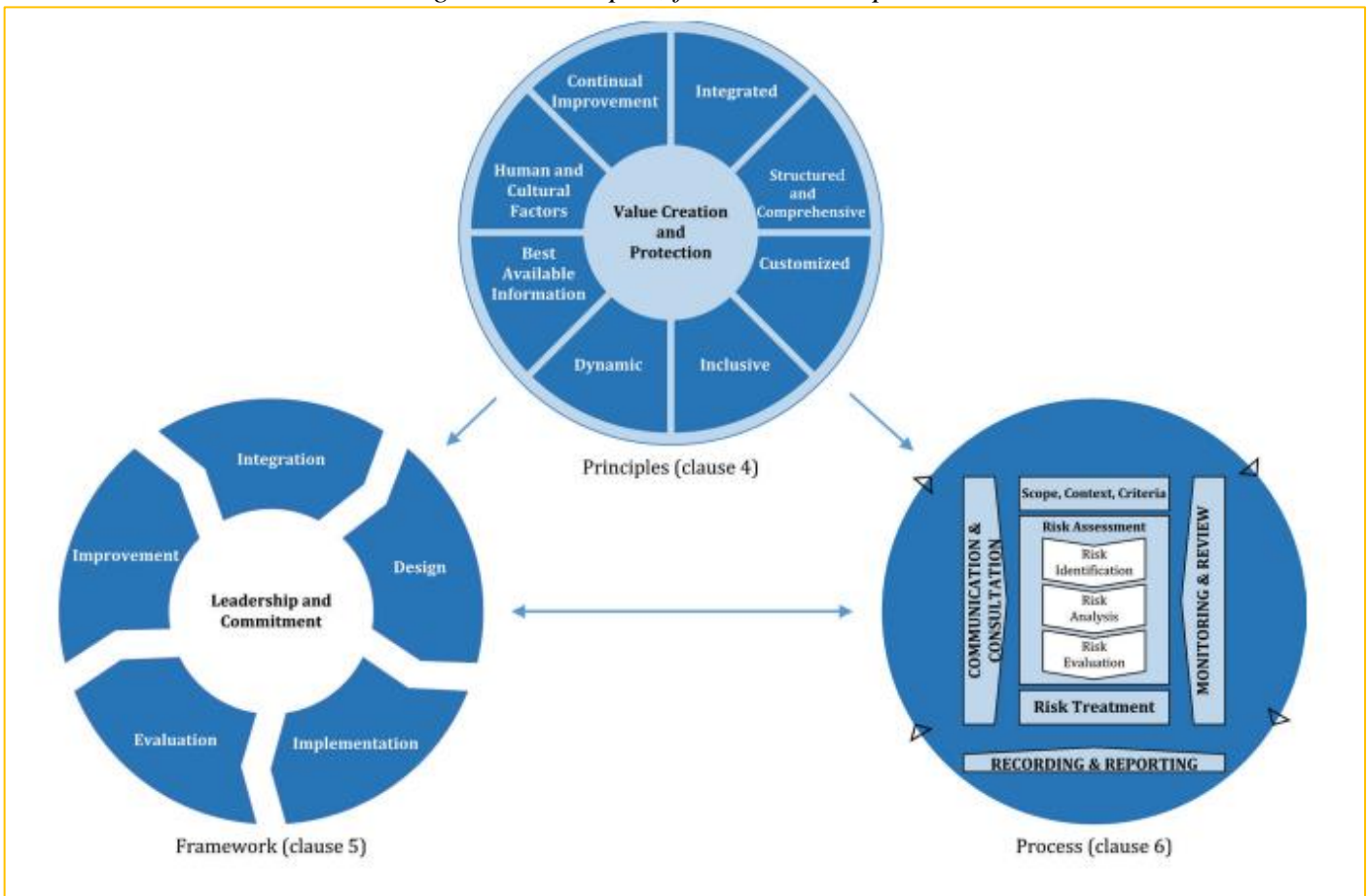
However, some experts believed that COSO's ERM manual was more likely to be just a general framework that presented difficulties in understanding and especially implementing ERM than to be considered as a source of guidance and information.

5.2. ISO 31000 Standard

In the ISO 31000 standard, which was published by the international organization for standardization in 2009, the main purpose was to provide a set of generic guidelines and principles that give guidance on the characteristics of effective and efficient risk management.

The standard gave recommendations for establishing a risk management framework that assists the organization in the integration of risk management into important activities and functions as well as establishing risk management processes. It also insisted on how it should be an integral part of management and decision making in addition to integrating into the structure, operations and processes of the organization.

Figure 2: Principles, framework and process



Source: international standard ISO 31000 second edition 2018-02, p 5

Some experts considered that ISO 31000 was unclear and lacked specifications in meaning, as a result it wasn't appropriate enough to be considered as a step-by-step method in implementing ERM.

5.3. Federation of European Risk Management Associations

In 2003, The Federation of European Risk Management Associations FERMA officially released The Risk Management Standard, it consists of a simple guide which highlights a systematic and practical approach to risk management and which is destined not only for risk managers, but also for decision-makers.

FERMA claims that risk management is «*the process whereby organizations methodically address the risks attaching to their activities with the goal of achieving sustained benefit within each activity and across the portfolio of all activities*».

According to this standard, risk involves both a downside and an upside; however, a common agreement is required for words terminology, risk management process, risk management organizational structure and objectives. The main objectives mentioned by the FERMA standard are:

- ✓ Viewing the opportunities and the benefits in relation with different stakeholders in the context of the activity;
- ✓ Methodical risk assessment (analysis , evaluation) in terms of occurrence and consequence;
- ✓ Methodical treatment of risks;
- ✓ Regular information flow in order to create an exhaustive risk mapping in addition to keeping an effective monitoring.

FERMA reference framework comes to improve the content of the ERM process by introducing responsibilities to managers and employees, in particular in their objectives and job descriptions.

SECTION II: THE REGULATORY FRAMEWORK OF RISK MANAGEMENT: SOLVENCY II DIRECTIVE

The following section is devoted to speak about the regulations that have been engaged in Europe since the appearance of the insurance sector and the efforts that aim to regulate the market in general by imposing a number of rules and principals on insurance companies in order to enhance the level of control and supervision.

1. Origins drivers of regulatory change

A wide set of regulations have been engaged by the European authorities since 1970'S in an attempt to improve consumer protection as well as to harmonize and codify the insurance regulation across the union at the very same time .

1.1.Early directives

The current insurance regulations are the result of a number of primary issued directives that consists mainly of:

- ✓ The first generation of solvency directives for both; non life and life insurance; in 1973 and 1979.
- ✓ Second - generation directives have been introduced as a consequence of opening up the European insurance market in 1988 and 1990.
- ✓ A third - generation directive in 1992 aimed to provide a better coordination among supervisors.

Although these directives offered the benefits of low cost implementation and a considerable degree of policyholder protection, they also suffered from a number of limitations that needed to be improved.

1.2.Solvency I

The absence of alignment between capital requirements and the presented risks by insurers products are reflected in the simplicity of the capital requirement calculation under Solvency I. However some experts claims that the directive consisted of an accounting approach that restricts the recognition of diversification and risk mitigation; it proved only useful in solo companies and limited risk governance and risk disclosure requirements.

The regulatory response to enhance the changing risk landscape management was translated by the initiation of Solvency II key principles, summarized by the three-pillar structure, risk-based supervision, and fair value.

1.3.Solvency II

Although the principal objective of the directive revolves around insurance companies' solvency, it is specified that capital is not essentially the perfect solution to address failure.

The main differences between the two directives are exposed in the following table

Table 2: Solvency I VS Solvency II

Solvency I	Solvency II
the revision and update of current EU solvency regime	A much wider scope
The institution of realistic minimum capital requirements	The harmonization of asset and liabilities valuation techniques
Lack of true faced risk reflection	Provide approaches to value assets by historical or amortized cost and by market value
Cannot cope with the variety of insurance company risks profiles and are therefore not aligned with the economics of the business & risks	Firms will be required to meet regulatory principles rather than rules (Principles-based)
The standard model approach	Allows insurance companies to use their own internal models rather than the standard model approach allows insurance companies to use their own internal models rather than

Source: Executive's Guide to Solvency II, Buckham, David, Wahl, Jason, Rose, Stuart, John Wiley & Sons, 2010

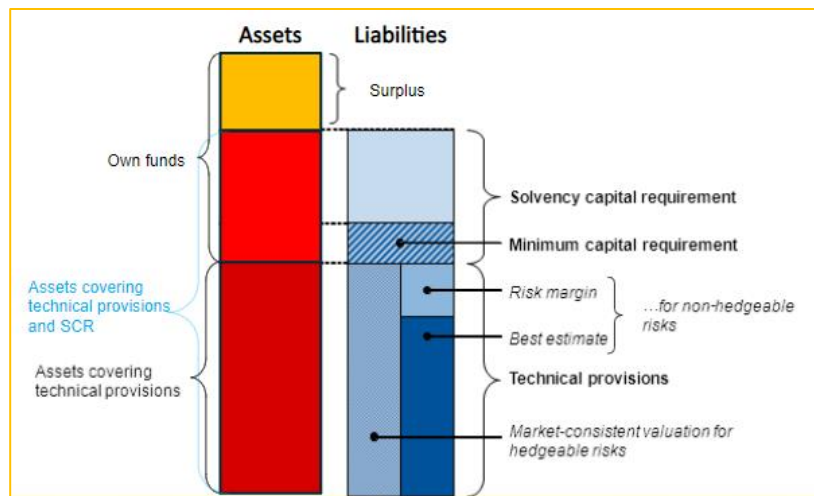
2. The Economic balance sheet

Solvency II introduced the adoption of the economic or total balance sheet, which aligns with International financial reporting standards when it comes to calculating the “ true ” value of assets and liabilities based on their market value so that their economic value is reflected rather than the accounting one.

The total risk types are integrated in the calculation of the required solvency capital knowing that policyholder protection is covered in the shape of capital called: own funds in solvency II, represented by the difference between the market value of assets (MVA) and liabilities (MVL).

In order for solvency coverage ratio of the total balance sheet to be adequate, loss-absorbing components of available own funds, defined as “eligible own funds” in Solvency II, must exceed the solvency capital requirement (SCR).

Figure 3 : The Economic balance sheet



Source: Solvency II directive

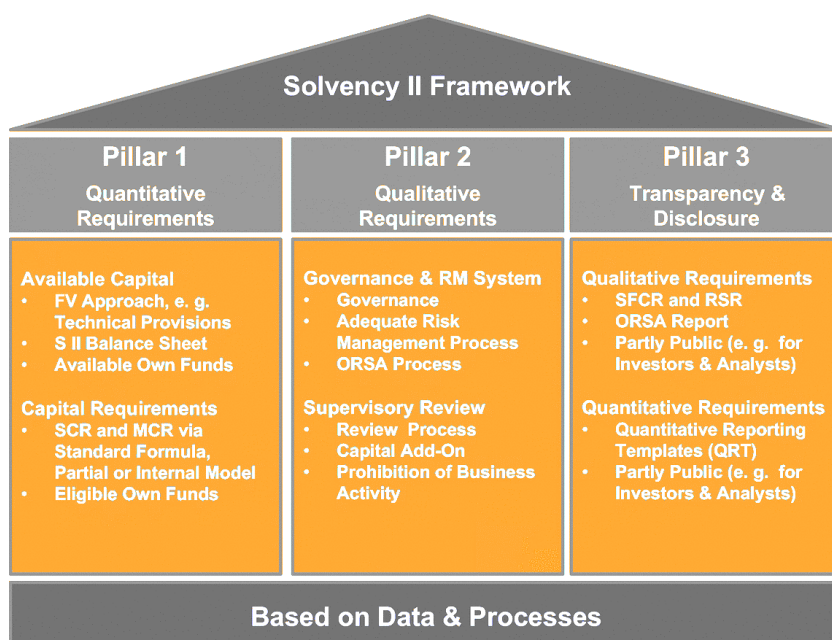
3. Structure of the directive

The Solvency II directive was inspired at large by the Basel II banking legislation; a similar three-pillar structure is applied, which in addition to improving the quality of transparency and governance; procures supervisors with essential tools to assess solvency and therefore covers the quantitative aspects using a based risk - oriented approach.

On the other hand, it covers qualitative elements that influence the insurer’s risk such as internal risk control, managerial capacity, and risk monitoring processes.

It is highly important that the three pillars must not be treated in isolation considering their obvious interaction.

Figure 4: Solvency II pillars



Source:
Solvency II
directive

3.1. Pillar I: Quantitative measures, technical provisions and capital requirements

The first pillar of Solvency 2 is based on four basic principles, which we can summarize in:

✓ Point 1: Assets Valuation

By default, assets must be valued based on their market value in the prudential framework of solvency II. This principle is in total opposition to the principle prior to Solvency 1, which was essentially based, as we have seen, on the valuation of assets at historic cost.

✓ Point 2: valuation of technical provisions at Best estimate

The technical liabilities under Solvency II are no longer determined in a prudent manner, but on the contrary at the most fair.

✓ Point 3: Market Value Margin

In order to take into account the difficulty of valuing certain liabilities, which do not have a market value properly speaking but rather a model value, the Solvency II directive requires adding this Market Value Margin to the best estimate.

✓ Point 4: regulatory capital requirements and available equity.

Finally, insurers must at all times have an excess of assets over regulated liabilities, at least equal to an amount defined by the legislations. This solvency margin is intended to ensure that insurers can absorb exceptional losses, linked to economic shocks, climatic events or operational problems, and therefore remain able to honor their commitments toward their policyholders.

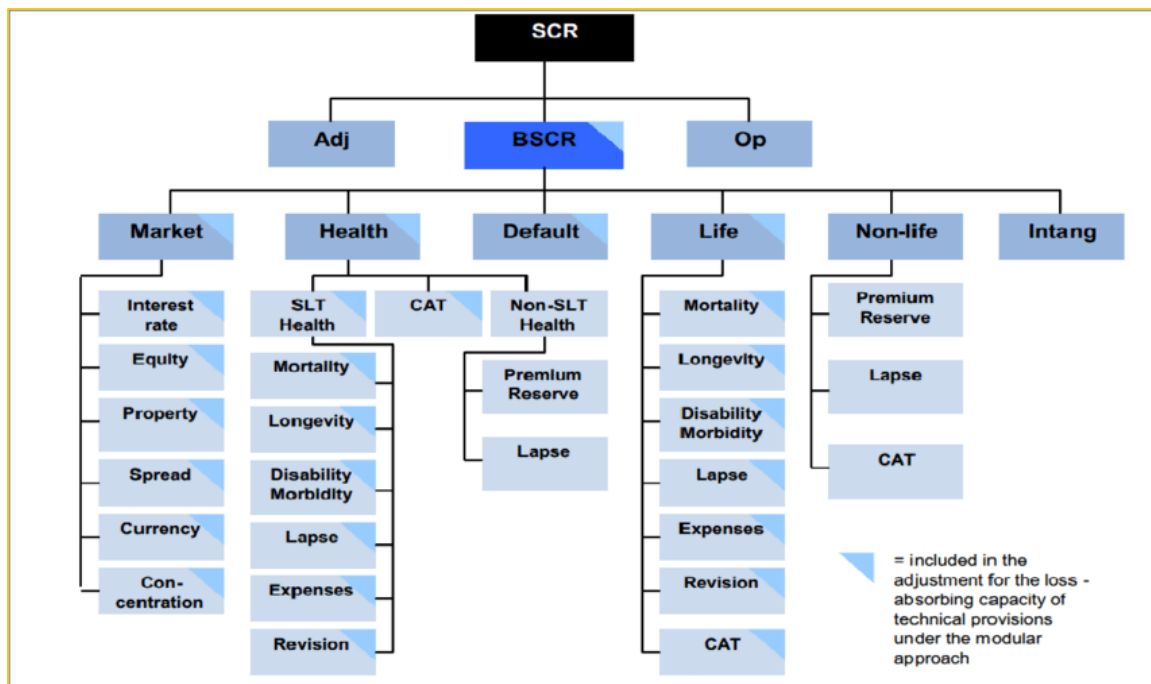
This first pillar determines the quantitative requirements of solvency II; this level of minimum solvency margin was broken down into two indicators under Solvency II the MCR (Minimum Capital Requirement) and the SCR (Solvency Capital Requirement).

The MCR, as its name suggests, is the minimum level of equity that an insurer must carry at all times to be authorized to continue its activity. The SCR is the level of target capital that each insurer must keep at least to continue its activity in good conditions. The

calibration of the SCR is based on a Value at Risk (VaR) model, over a 1-year horizon, at a 99.5% quintile (therefore a shock of a recurrence of 1/200 years).

However, the company must specify whether it will be adopting the standard formula or the full or partial internal models approach. Under the standard formula, the SCR is calculated as the sum of the basic solvency capital requirement, the capital requirement for operational risk, and an adjustment for the loss-absorbing capacity of technical provisions and deferred taxes.

Figure 5: Solvency capital requirements modules



Source: Operational risk module, Mohammed Zouari, IFID, 2020

3.2.Pillar II: Qualitative measures, governance, risk management, supervisory interaction

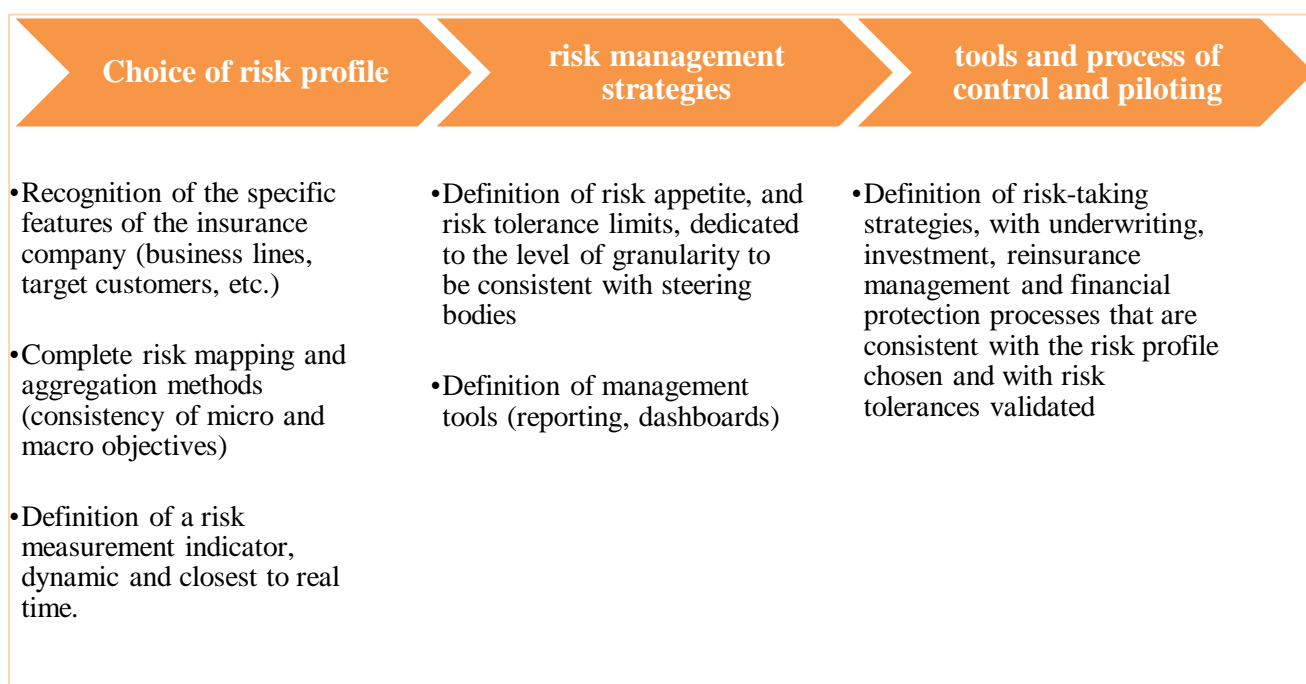
This Pillar revolves around the assessment of the effectiveness of insurer’s risk management procedures. An effective governance and risk management system, owned and put in place by general management; are key elements to be required therefore, two basic requirements are distinguished: the Own Risk and Solvency Assessment (ORSA), and the Supervisory Review Process (SRP)

The new center of attention for both companies and regulators remains the ORSA, this concept is a fundamental part of Solvency II .The activity of an insurance company cannot be reduced to compliance with its SCR only ; the annual SCR is a powerful indicator,

but remains insufficient to both intelligently pilot a company or to supervise it just as intelligently.

The own risk and solvency assessment gathers at the same time each of the tools, the process and the decisions that allow insurance companies to guide and pilot its risk profile, starting from policies underwriting until the liquidation of technical provisions. It is based in particular on a sequential process as illustrated in the graph below

Figure 6: ORSA Process



Source: Solvency 2 - Impacts stratégiques et de marché, Morlaye, Frédéric, RB édition, 2017, p67

This operational diagram makes it possible to systematize the approach, to define processes, tools and indicators useful for the effective management of the insurance company.

3.3.Pillar III: Supervisory reporting and public disclosure

Disclosure both privately to supervisors; and publicly to other stakeholders; are covered by the third pillar of the directive. A range of changes are proposed globally; in addition to new specific financial reporting standards destined particularly to insurance companies by the International Accounting Standards Board, a risk classification and a best estimate methodology to calculate technical provisions were also suggested by the IAA

The new required disclosure documents for every company are mainly the Report to Supervisor (RTS) and the public Solvency and Financial Condition Report (SFCR).

SECTION III: MAIN RISKS TO BE CONSIDERED IN ERM

Risk must be identified and categorized in a way that makes it easier to be managed. In this section we will summarize the number of risks relating to insurance companies according to the most competitive work groups and references; in an attempt to reduce their impact

1. FERMA classification

According to FERMA, an insurance company can face several risks; these risks are divided according to their origin; both internal and exterior factors are distinguished

According to the FERMA model, two main types of risk are encountered:

- ✓ Endogenous risks, specific to the organization’s activity, which are linked to its processes, organization, information system, management, etc.
- ✓ Exogenous risks arising from an organization's environment: customers, suppliers, members or shareholders, competitors, financial markets, natural disasters; as the organization has little control over such risks, it is nevertheless necessary to put in place control and monitoring elements to limit damage.

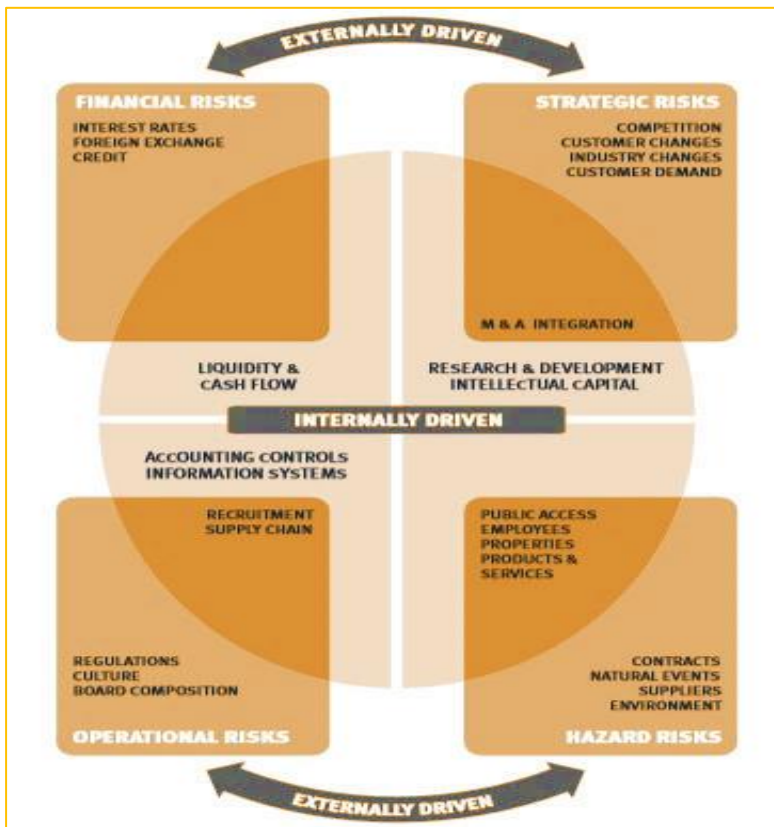


Figure 7: FERMA risk diagram

Source: FERMA, a risk management standard, p04

2. The Institute of Internal Auditors risk inventory

IFACI work team suggested a classification of four main families; designed in three risk levels, this classification attempts to link more easily the specific identified risks to each risk family. In addition, this updated nomenclature incorporates the risks defined for the standard formula by the Solvency II directive. Each of these four families was divided into 27 level 2 risks, which were in turn broken down into 192 level 3 risks according to the desired level of granularity. Four main families are distinguished according to this risk inventory: Financial risks, Insurance risks, Operational risks, Strategic and environmental risks.

The table below gives a detailed presentation of this nomenclature

Figure 8: Risks according to IFACI

Level 2 Risks	Level 2 risks definition
1. Financial risks: Risks related to changes in financial markets, balance sheet or financial management	
Solvency risks	Risks resulting from a level of equity below the regulatory minimum
Assets/Liabilities adequacy	Risks resulting from a mismatch, in amount or structure, between the liabilities corresponding to the commitments made to clients and the represented asset
Assets management	Risks relating to asset management
Indebtedness	Risks resulting from excessive indebtedness having regard to repayment charges or the rates of outstanding loans
2. Insurance risks: Risks specific to technical insurance activities	
Technical	Risks resulting from product characteristics that adversely affect their profitability
Underwriting	Risks relating to the underwriting of insurance policies, or to the acceptance of treaties or optional reinsurance, excluding

	claims and benefits
Non-life claims / Life benefits	Risks resulting from a deviation of the claim or service charge compromising the expected balance between premiums and technical charges of the portfolios
Provisioning	Risks resulting from inadequate provisioning to changes in the claims and services in progress or to come
Participations in profits	Risks relating to profit sharing attributed to life policyholders
Protective reinsurance	Risks resulting from conditions negotiated with reinsurers
Control of results	Risks related to results control
3. Operational risk : Risk of losses resulting from internal procedures, staff or inadequate or faulty systems, or external events	
Clients / third parties, products and business practices	Losses resulting from unintentional act or negligence in the exercise of a professional obligation towards the client (including fiduciary and compliance requirements) or losses resulting from the nature or design of a product
Execution, delivery and Management Process	Losses resulting from a problem in the processing of a transaction or in the management of processes or losses suffered with commercial counterparties and suppliers
Dysfunctions of activity and systems	Losses resulting from business interruptions or systems malfunction
Employment and Workplace Safety	Losses resulting from acts incompatible with the relevant law

Practices	employment, health or safety legislation, payment of compensation or social discrimination
Damage to tangible assets	Losses resulting from loss of or damage to a tangible asset at the following a natural disaster or other disaster
Internal fraud	Losses due to an intentional act of fraud, misappropriation of property, breaches of law or company rules that involves at least one person internally
External fraud	Losses due to an intentional act of fraud, misappropriation of property, breaches of laws or rules by a third party
4. Strategic and environmental risks: Risks relating to business management , to direct reputation risks and to risks generated by the business environment and to emerging risks	
Insurance market	Risks resulting from the behavior of players in the insurance market. Risks of strategic choices, associated resources or management of inadequate implementation
Marketing Risks	resulting from a poor insurance marketing approach
Reputation Risks	linked to a negative perception of the company
Legislative, regulatory and judicial	Risks associated with the appearance of new laws or regulations, and their application
Other systemic and exogenous risks	Other risks arising from the company's external environment

Source: Cartographie des risques (2e éd.) - Groupe Assurance (octobre 2013), IFACI

CONCLUSION

In this chapter, we have discussed the foundations of risk management, and we have emphasized the importance and complexity of the multiple dimensions of this concept.

Indeed, strengthening the solvency of insurance companies has become a priority following the evolution of the economic and regulatory context. In this regard, the constraints imposed by the "Solvency II" directive, provide a strict operating framework for insurance companies in terms of control and minimum level of capital to possess. This framework aims to control risks in order to be able to operate safely in a competitive market.

ERM is one of the contributions of the Solvency II directive. Its implementation should make it possible to identify and manage multiple risks with a view to developing the methods for dealing with them. It must also ensure the control and development of the business.

These considerations make it possible to understand the usefulness of this system and its essential role in the identification, good knowledge and evaluation of the various risks to which an insurance company is exposed. In this context, risk mapping constitutes a central tool of the ERM system.

CHAPTER II:

**RISK MAPPING AS
A RISK
MANAGEMENT
TOOL**

CHAPTER II: RISK MAPPING AS A RISK MANAGEMENT TOOL

In the first chapter, we highlighted the role of ERM as an essential tool for achieving strategic objectives, meeting requirements at all levels and good control of all activities. To this end, the establishment of an effective internal control system first requires a precise diagnosis of the risks to which an insurance company is exposed, using not only the rules of the standard formula given by the Solvency II reform, but also by a set of very sophisticated qualitative and quantitative tools.

But before setting up this system, a "risk manager" must first set a clear and simple methodology adapted to the internal context in which it will be established, based on the appropriate risk profile

This diagnosis can be formalized through risk mapping, which is an essential tool for any organization aiming to prevent failures. This mapping must be part of a continuous updating approach in order to deal with emerging risks and organizational and regulatory changes.

In this chapter, we will highlight the conceptual approach of the development and the implementation of a risk map as a regulatory tool, which is primarily intended to integrate the dimension of operational risks in the valuation of capital from the solvency standard (II)

SECTION I: RISK MAPPING BACKGROUND

Risk management is a process that needs to be supported with appropriate tools in order to achieve the expected results and manage risks systematically. Through this section we will clarify the principles that define risk mapping, emphasize its utility and significance for insurance companies, then we will speak about the actors that intervene in the operation as well as their responsibilities, finally we will give a view on the type of risk mapping that should be selected in adequacy with the companies' expectations.

1. What is Risk mapping?

Risk mapping is a common tool usually used by insurers as the initial step in an (ERM) process, or as the primary risk management process for companies that still have not developed a full ERM system.

Several definitions have been given to risk mapping, IFACI work team state that: *“Risk mapping is a dynamic process for identifying and evaluating risks which allows giving a synthetic and visual representation. Thus it constitutes a tool for highlighting the risks to be covered as a priority”*

Risk mapping is a fundamental tool in risk management, it has the advantage of illustrating, at a given moment, the results of the carried out analyzes. It is a visual, which makes it possible to compare the different risks generally represented in a matrix form, each of the analyzed risks, is positioned there according to its likelihood and impact; it is used in particular to support discussions with governance on the level of risk acceptance and the treatment strategies to be implemented. It is a punctual representation that requires regular updating.

2. Why risk mapping?

It is important to realize that risk mapping does not always end up by providing perfect carved in stone results, but it represents an interactive process that refines managements' understanding of the risk profile and appetite, the managed exposures, and measures as well as the effectiveness of the mitigation strategies employed in controlling risk.

The essence of risk mapping revolves around the question: ‘what can possibly go wrong? The analysis of the different business processes provides not only distinct, but highly complementary responses such as:

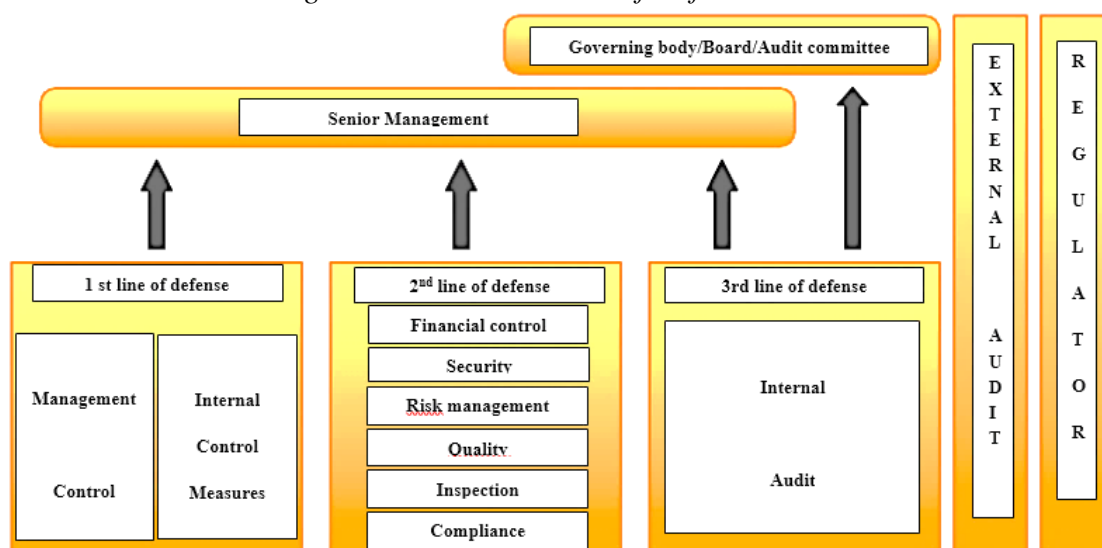
- ✓ The understanding of the original causes and consequences of specific events;
- ✓ Incite top management to consider some risks earlier and guides the development of a control assessment;
- ✓ Give birth to a database of quantitative and quantifiable information that allows the company’s risk profile modeling, as well as guiding corrective or preventive actions;
- ✓ An integrated risk management process is fostered by this approach, so risks are no longer managed as independent silos, and demonstrates how risk can influence operations of another business unit within the organization;
- ✓ It enables the company to enhance risk management and risk governance by prioritizing the risk management efforts thanks to the comprehensive visualization of likelihood and impact that it offers which allows them to focus both time and money on the most potentially damaging risks identified in a heat map chart;
- ✓ Also, a risk map enables interdepartmental dialogs about the inherent risks of an organization, and promotes risk communication across the organization;

3. Mapping actors

Nowadays, it is common that most organizations rely on ERM specialists, internal auditors, diverse specialist teams to manage risks and implement a variety of risk control functions with diverse perspectives and specific skills. Yet the challenge remains in assigning specific duties, clear responsibilities, effectively and efficiently coordinating the gap between these groups to get rid of coverage duplication.

Professionals must understand boundaries of responsibilities, as well as how their positions fit into the organization’s overall risk and control structure.

Figure 9: The Three Lines of Defense Model



Source: Adapted from ECIIA/FERMA Guidance on the 8th EU Company Law Directive, article 41

An effective way to enhance communications on risk management and control is provided by The Three Lines of Defense model, it distinguishes among three lines involved in effective risk management:

- ✓ Functions that own and manage risks.
- ✓ Functions that oversee risks.
- ✓ Functions that provide independent assurance

The model is developed by IAA and it aims to help organization define specific roles in terms of internal control.

3.1. The first line of defense or the operational management

In the first line of defense, risks are owned by operational managers for example, divisions responsible for managing insurance policies, claims, ...ect. Their knowledge of the domain offers them an essential role in identifying risks inherent to their activity; conducting a primary assessment; risk mapping maintenance by processing and controlling deficiencies and implementing a range of corrective measures and key control elements. Management is therefore responsible for controlling risks within its scope. It examines the risk exposures, defines the priorities in the light of the risk analysis.

3.2. The second line of defense: risk management and compliance functions

The first line must be supported and monitored by a multitude of risk management and compliance functions to ensure its effectiveness. This typically includes:

- ✓ A risk management function that assists risk owners in targeting the risk exposure as well as reporting information related to risk throughout the organization;
- ✓ A compliance function with the main objective of monitoring specific risks. A multitude of compliance functions typically exists in one company; each has a responsibility for a specific type of compliance monitoring;
- ✓ A controllership function that monitors financial risks and financial reporting issues.

The management independently from the first line of defense establishes these functions in order to ensure its proper design and the intended operations; meanwhile they might intervene directly in changing and developing risk management systems.

3.3.The third line of defense: internal audit

The internal audit provides assurance on the effectiveness and the adequacy of the internal control system and governance including the manner in which the first and second lines of defense achieve risk management and control objectives. That usually covers:

- ✓ A wide variety of objectives
- ✓ All components of internal control and risk management framework
- ✓ The overall entity including business processes as well as supporting functions

By using the findings and recommendations of the internal audit, the risk mapping can be enriched and brought to life

3.4.External auditors, regulators, and other external bodies

Although other external bodies such as External auditors or regulators are considered outsiders to the organization's structure, they can significantly contribute to the overall governance and control structure as additional lines of defense if coordinated effectively. This relates to regulated industries, for example, financial services or insurance companies in case of set requirements by regulators so that control is strengthened and defense lines are assessed.

4. Risk Mapping Scope: General risk mapping VS thematic risk mapping

According to Mareschal (2003), two main types of risk mapping are possible: global mapping and thematic mapping. The choice of one or the other of these options is based on the objectives of the study and cost on benefits.

4.1.Global mapping

It focuses on studying all the risks facing the insurance company. It covers as broad a spectrum of activities as possible, while addressing all categories of risk. This approach is intended to be exhaustive and aims to spread a culture of risk at all levels of responsibility. This approach makes it possible to establish a global vision of risks and to better understand the multiple connections that make the complexity of the business.

4.2.Thematic mapping

In contrast to global mapping, this type of mapping is only interested in a specific area or in one (or a few) risk categories. It allows all efforts to converge towards the most risky areas because of the advantage of precision. It may be set up to support a new project within the company. Thematic mapping is less resource-intensive and can be an interesting starting point.

However, this approach ignores the interdependencies between the different risk categories, or even the relationship of cause and effect between the components of the same large risk class. As a result, technical and financial results are highly correlated in extreme situations (for example, financial crises). Inflation affects both the effective rate of return on investment and the amount of future compensation while natural disasters can affect a number of lines of activity.

SECTION II: KEYS TO SUCCESSFUL MAPPING

In order to end up with a successful risk mapping that reflects the true risk situation faced by the insurance company, certain conditions needs to be respected. In this section we will give a resume on the key elements that we judge to be effective and useful when running a risk mapping process, and how to define the appropriate approach as an initial step that contributes to a better understanding of the whole process.

1. Strong will of managers

This will must be expressed on two different levels: First, the Board of Directors, including the Chairman, is in charge of releasing a 'Chairman's report' on internal control procedures. Nevertheless, detection and risk management is the foundation of a successful system of internal control. The audit committee, as it operates, is the privileged place where this would have to happen.

At the same time, general management must build the conditions and provide the means for carrying out this risk mapping, which inevitably implies the allocation of dedicated resources; more broadly, the Management Committee must be completely involved, if only because each Manager, whether operational or functional, must initiate this process under its own stewardship.

2. Setting objectives

When speaking about the internal control environment ; for each entity of the company; a set of objectives must be defined in reference to the adopted strategy and that is by: profession, geographic area, market segment.in addition to the results that the company expects from it: objectives for turnover, production, technical margin, quality of customer service, financial products, operating profit, etc.

3. Mandatory passage through process mapping

There are several reasons for developing a process mapping in a company, but there is at least one reason that makes it essential: to draw up a map of danger.

What are the main processes of the concerned entity and do they allow the achievement of objectives? Here, it is certainly necessary to divide the macro-processes into sub-processes (or specialized processes) but also to be careful with the chosen granularity level, which would make the mapping complex, even inoperative. It is indeed advisable to remain at process level that carries significant risks. Three main types of processes can be distinguished in an insurance company:

- ✓ Business processes : production, collection, claims, pension
- ✓ Supporting processes: HR, finance, accounting, IT, treasury, legal, internal control;
- ✓ Managerial (or steering) processes: strategy, action plan, budget.

4. Approaches overview

According to their starting points. Three main approaches are distinguished in the process. These are essentially:

4.1. The bottom-up approach

The governance expectations in this approach revolve in priority around the control of activities that directly contribute to the achievement of the objectives; as well as those whose good achievement is the basis of a healthy organization. We speak of a bottom-up approach because the starting point for reasoning and work is at the operational level.

4.1.1. Process identification

To begin with, a process is a set of operations or activities carried out by actors, with means, and in a given framework, from an external triggering event (input) leading to a result, finality (output).

A tedious description and listing all of the company's sub-processes should be avoided, an appropriate detail or granularity level should be chosen in adequacy with the mapping objectives to identify significant risks in a relevant manner. The mapping perimeter or scope can be limited by giving priority to key processes.

Figure 10: Granularity levels



Source: Cartographie des risques (2e éd.) - Groupe Assurance (octobre 2013), IFACI

4.1.2. Risks identification

Operational activity management conducts initial risk identification jointly with risk mapping teams during interviews or workshops with operational staff, the risk description can be done on the basis of a survey or openly, thus facilitating risk identification. In this case, the reasoning must refer to the objectives of the process. What is the purpose of this process? What are the key steps? What are the events likely to compromise their achievement?

The efficiency of the control system that will result from the mapping depends on the precision of the defined risk; which is generally documented using its context, description, possible causes and impacts.

4.1.3. Risk assessment and priority setting

Risks are assessed quantitatively based on all of the collected information whether already existing data like: statistics and dashboards, incident databases, technical accounts, etc.; or gathered during risk identification process, such as counting operations and anomalies, setting up observation statistics, etc

In summary, the evaluation may be either qualitative and based on internal audit reports or expert opinions, or semi-quantitative and based on a pair rating system for frequency / impact, or quantitative when a probable loss is associated to risk.

4.2. Top down

The governance expectations in this approach relate to securing the strategic objectives, the major risks that may limit the achievement of the strategic goals of the organization or threaten its main assets; risks are collected at the top management. It is a matter of; starting from the strategic objectives and the challenges of the organization by asking about the scenarios that might favor or compromise their achievement. The starting point for reasoning and work is from the general management level.

4.2.1. Risk identification and assessment

The top management can identify major risks with a strong impact and/or high frequency; this risk collection, formalization and evaluation exercise is carried out by the senior managers of the insurance company. However, this type of analysis will quite likely to have a low granularity level.

4.2.2. Reconciliation with the existing risk nomenclature

Generally, risk identification is carried out with the top management by interview, with open questions. In order to consolidate the results and to provide an exhaustive vision of the risks, an attachment to the risk classification of the organization is expected.

4.2.3. Linkage to business processes

Linking risks to the processes is a necessary step in order to allow proper groupings and consolidations; during this phase, the double goal of making the identified risks consistent with the entity's activities and the exhaustiveness of the analysis is to be met.

The following table shows the main differences between the two approaches:

Table 3: Top down VS Bottom up

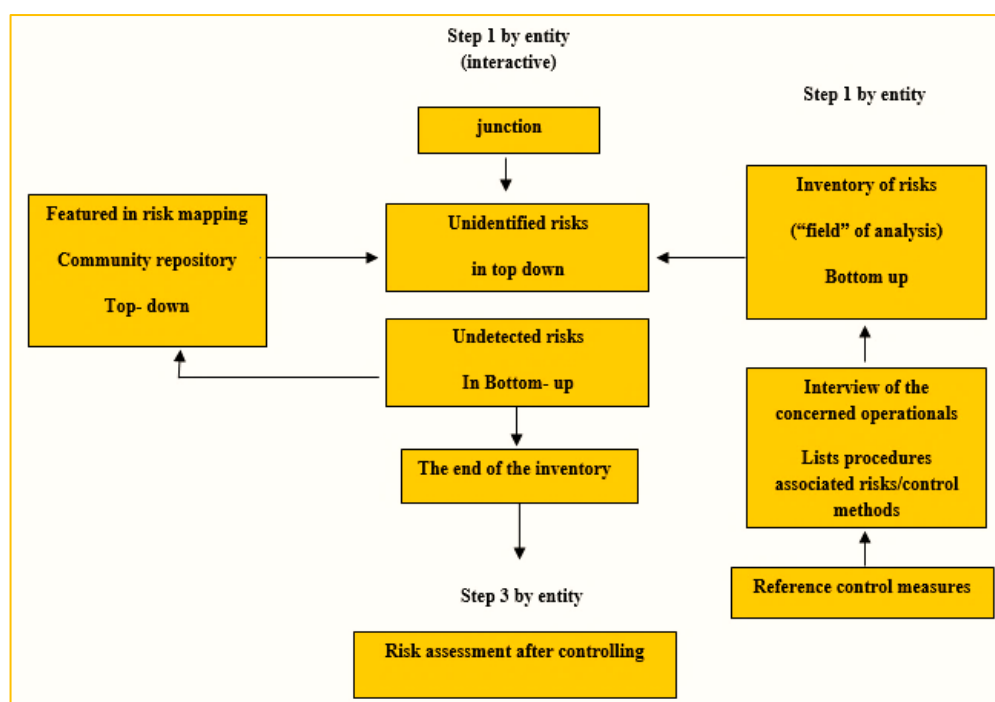
Approach	Top down	Bottom Up
Governance expectations	Need for an overview of the risks likely to compromise the achievement of strategic objectives or major organizational issues	Need to be reassured about the control of activities: desire to control the risks likely to compromise the proper performance of the activities.
Level of granularity of the analyzes	Macro vision, analysis located at the level of strategic objectives and major organizational challenges	Micro vision, analysis located at the level of activities and processes that describe them
Skills sought in-house	People with a good overview of the organization and its objectives or strategic issues and / or people with knowledge of the influences of the external context on the strategy	People with a good command of their activity
Types of identified risks	All types of risk, whatever their nature: strategic, legal, operational, managerial, reputational, etc.	Mainly operational risks: identification of threats linked to the methods of carrying out the activities analyzed

Source: Management du risque : une approche stratégique : Cartographie des risques : prenez de la hauteur !, Sutra, Géraldine, AFNOR, 2018, p 37

4.3. Combined approach

In a mature system, the top- and bottom- approaches must be combined and developed to assure a better coverage of risks. These two methods aim to feed the organization's risk mapping and bring it to life. Indeed, not only do these two approaches not contradict each other, they are complementary. They can be carried out either successively or simultaneously.

Figure 11: Combined approach



Source: Cartographie des risques (2e éd.) - Groupe Assurance (octobre 2013), IFACI

The reconciliation and consolidation of the elements of these two methods will be facilitated by the use of common and coherent risk classification, the repository of organizational processes and the rules on quantification.

5. Designing, implementing and monitoring action plans

The taken decisions are subject to the action plans definition and implementation. These must be formalized and linked to the identified risks. A mechanism for monitoring these action plans must be put in place.

6. Avoid pitfalls

No matter the chosen approach is, many pitfalls might manifest during the process and this should be taken into account from the beginning of the mapping.

The inventory of processes and inherent risks must not result in excessive finesse in terms of granularity. Similarly, the search for an exhaustive list of risks may lead to a long process of identification; some of these risks ultimately prove to be immaterial or irrelevant.

Operational staff may get limited to a framework driven by questionnaires or reference maps. In addition, certain risks may not be identified due to an overly inquisitive approach, there by creating a climate that is less conducive to spontaneous risk expression.

As far as the evaluation is concerned, it is a question of ensuring the adequacy of the chosen methods with the objectives of the mapping process. Indeed, in some cases, a quantitative approach may prove inappropriate. On the other hand, the use of purely qualitative methods does not always make it possible to assess precisely the importance of the control measures to be implemented.

7. Regular updating

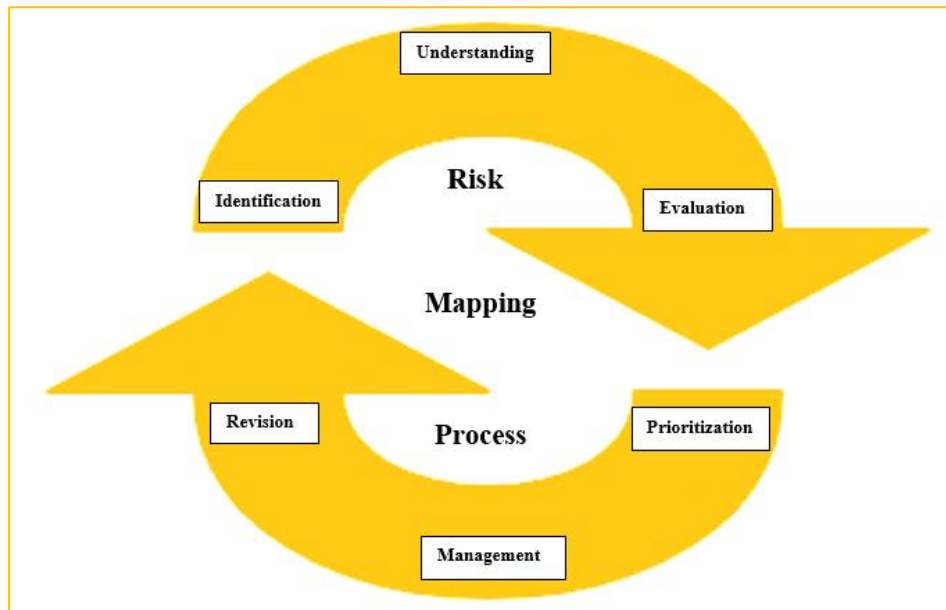
The completion of the risk mapping process is a key step in the implementation of the internal control system. It is still necessary to bring this risk mapping to life by updating it on a regular basis. Otherwise, and given the rapidity of the evolution of the company's life, this mapping would quickly become inoperative and the company would lose the benefit of the investment made at the outset.

The conditions presented above constitute a quasi-ideal situation, which we must try to approach. Obviously, the reality means that certain conditions will be imperfectly fulfilled, which should not prevent the production of the mapping

SECTION III: RISK MAPPING IMPLEMENTATION METHODOLOGY

Risk mapping is a long and time-consuming process that needs lots of work and efforts, this section will therefore explain the adopted approach in general for the establishment of risk mapping. However, it should be noted that there is no standard approach for setting it up because the mapping must be specific to the organization and it must depend on the management cycle implemented

Figure 12: Risk mapping process



Source: best practices for the risk mapping process, by david ingram, and paul headey, P 01

1. Step 1: Risk identification

It is essential for each company, to run a very careful risk identification so that all the potential events that could interfere or disrupt the achievement of its objectives are listed. This will significantly contribute in giving a clear vision on the different fragilities that might jeopardize the company's survival.

This step is considered to be the most important step in the process; it comes as a response for the massive need for developing a common language for risk management within the company .The main question remains in how to define and identify these risks?

In reality, a number of methods were developed to make it possible for these risks to be identified:

- ✓ Identification based on the achievement of objectives : this involves first identifying the objectives of the activity or company and then assigning the corresponding threats to them. Alexandre said (2005: 3).
- ✓ Identification by time: Past analysis involves taking into account what has happened before in the same or comparable situation. In each case, one must ask whether the risks identified in the past could arise again. Unlike the analysis of the past, current (or

present) assessments do not use previous references; they are based solely on the situation data as required. In addition, there are several methods (future analysis) that encourage participants to use their imaginations to discover risks that could influence the achievement of their objectives.

- ✓ Identification by elementary tasks: this method is used by risk managers to build their internal control survey. It is a matter of asking the following question: "What would happen if a task was done badly or not done at all?" claims Jacques Renard (2005).
- ✓ Identification by process or function : It consists first of identifying key processes and then assigning corresponding risks to each of the three main process families

Based on a comprehensive but generic list of risks, the company should select its own list of risk by taking into consideration the relevance of the company's activities, the impact on the financial condition of the company and the ability to manage risks separately from other risks.

This step is often accomplished as a brainstorming exercise by involving key team members from across the company, which leads to the compilation of a comprehensive list .The final "risk list" must be later checked for consistency with the business plans of the company and the intended risk management processes.

2. Step 2: Risk understanding

A broad understanding is needed for each selected risk from Step 1. This includes the determination of whether the risk is driven by internal or external events. In some situations, it may be helpful to actually plot; the exact sequence of events leading to a loss situation. This could result in the identification of intermediate intervention points where losses could be prevented or limited.

Existing risk measurement and control processes should be documented and, if the loss sequence has been plotted, the location of the control process in sequence should be documented.

The final step in risk understanding is to study recent risk-related events, including loss events, successful risk control or mitigation, and near misses both in the wider world and within the company.

3. Step 3: Risk Assessment

Immediately after the risk has been identified and listed, the next step consists of evaluating it with regard to the two key parameters in the matter, risks can be measured by two characteristics : impact (I) and frequency (F), again with the help of methodological approaches.

Considering the lack of statistical database on all types of previous incidents, the fundamental difficulty in risk assessment resides in the determination of its occurrence rate; in addition, the impact assessment is often difficult for small capital.

3.1. In terms of likelihood

A question needs to be asked and answered is : How probable is it that each risk will become a reality? The likelihood or the frequency of occurrence is the estimated vulnerability assessment; it identifies the potential for risk to actually occur.

The probability of a risk occurring depends on the exposure of the processes to a threat. Exposure defined here by IFACI as: *“the vulnerability that makes possible the loss or perception of a threat to an asset or activity that generates assets”*.

The potential risk frequency can be assessed based on internal statistics such as the number of observed incidents, as well as market information and staff surveys like risk questionnaires and interviews. In general, the risk likelihood is inversely proportional to the quality of risk management "a well-controlled risk has a very low probability of occurrence".

How to determine the frequency of occurrence of the risk? By estimating the occurrence of events that may be causing the risk.

Table 4: The frequency measurement scale

Quotation	Frequency	Measuring element
1	Exceptional	Almost zero occurrence (<1%) over 2 years
2	Rare	Occurrence possible but unlikely (1 to 10%) over 2 years
3	Probable	Plausible occurrence (10 to 50%) over 2 years
4	Very likely	Very likely occurrence (> 50%) over 2 years

Source: Cartographie des risques (2e éd.) - Groupe Assurance (octobre 2013), IFACI

3.2. In terms of impact

The next question that needs to be asked and answered: If the risk becomes a reality, how badly will it damage the project? According to IFACI, if the risk materializes the consequences will fall into one of the broad categories, namely:

- ✓ Financial impact (e.g. financial loss, revenue decline, cost increase), direct or indirect, immediate or long-term.
- ✓ Legal impact (e.g. civil and/or criminal liability, legal and/or professional sanctions, etc.);
- ✓ Impact on the image (deterioration of the image, reputation);

The potential financial impact of a risk can be assessed based on internal statistics such as accounted and predefined amounts, staff surveys, and expertise as well as market information.

Table 5: The impact measurement scale

Quotation	Impact	Financial (result)	Image , reputation, regulation
1	Limited	<10% of the annual result	Attention of third parties (press, pressure groups, etc.) on subjects deemed sensitive
2	Significant	10% to 50% of the annual result	Adverse communication in media on part of the business and at a local level
3	Major	Major 50% to 100%	Wider media coverage, but not involving no major effect
4	Critical	> to the annual result	Media attack having significant consequences on the image and reputation of the Group

Source: Cartographie des risques (2e éd.) - Groupe Assurance (octobre 2013), IFACI

3.3. Control elements

The existing means that are put in place to reduce or eliminate risk are considered as control elements. This could involve both the frequency and the impact as a preventive or corrective measure. Thus, each risk is associated with one or more control elements. It is understood that the same element of control can be applied to several risks.

They are generally consisted of the assigned tasks to employees, manuals of procedures, guidelines, instructions and clear written rules, clearly defined and formalized organizational

charts or structures, verification actions, dashboards, IT systems...etc .The assessment scale of the concerned elements must be established and adapted to the organization.

Table 6: Control elements scale

Quotation	Control level	Measuring element
1	Mastered	Systems put in place to reduce the frequency or impact of risk at a satisfactory level: written and detailed rules, formalized and applied controls (monitoring and control indicators, evaluation procedures, etc.)
2	Acceptable	Arrangements in place to significantly reduce the frequency or the impact of the risk: written rules but to be completed, elements of existing and relevant control, formalized but to be completed.
3	Insufficient	Systems put in place that do not significantly reduce the frequency or impact of the risk: oral rules, control elements partially existing or relevant and not formalized.
4	Low	Lack of control element: no or few rules, we rely on experience, no or little feedback, no or little staff awareness of the risks.

Source: Cartographie des risques (2e éd.) - Groupe Assurance (octobre 2013), IFACI

These elements lead to a full or partial control of risk, in terms of consequences, to contain it in acceptable areas. Consequently, these control elements transform the raw risk into a residual or net risk.

3.4.Gross Risk

Impact and frequency shall be used to determine raw or inherent risk rating. Raw risk or gross risk rarely matches the risk that the organization actually bears thanks to the effect of the control elements .The Gross risk can be summarized in the following equation:

$$\text{Gross risk} = \text{foreseeable impact} \times \text{frequency of occurrence}$$

3.5.Residual risk

For some, the previous assessment of raw risk is considered as an intermediary. They prefer to think directly about residual risk, integrating the elements of control from the first risk assessment work.

The residual risk is the criticality that the risk presents after taking into account the protective effect of the control elements in place such as: internal control, financial coverage, risk transfer, etc.

$$\text{Residual risk} = \text{Frequency} \times \text{Impact} \times \text{Control element}$$

The weight of the risk thus determined allows the prioritization of the main risks and the prioritization of the action plans to be established.

4. Step 4: Risk Prioritization

Clearly, the key to effective risk management is an in-depth understanding of all exposures that an organization is confronted with, their characteristics and their root causes to infer their potential economic impact

The risk frequency, severity and control assessments of Step 3 are then consolidated into a single report. Risks are ranked according to the combined score of the three assessments. The ranking begins with the risk with the worst combination of frequency, severity and control scores.

4.1. Risk matrix: for what?

The desired outcome of the diagnostic is a list of exposures; as exhaustive as possible; and a ranking by order of priority on the basis of the "long-term economic impact" in a two-axis table form: on one axis, the frequency of the event taking place and on the other, the potential impact, the risk matrix provides an appropriate tool for risk classification.

This matrix is not permanent it is a transitory aid to decision-makers. However, this function as an information tool for managers and executives must provide them with some insight into the risk; therefore, the risk classes thus described must be defined in measures that make sense to them in the light of the decision to be taken

The combination of frequency and severity sets the long-term risk weight, but judgment must be exercised. At this stage, the traditional green, yellow, orange and red zones depend on the acceptability of the risk level dictated by the risk appetite of decision makers or stakeholders, these different color zones also called "temperature zones", and they represent the level of criticality of the different risks.

Figure 13: Risk Matrix

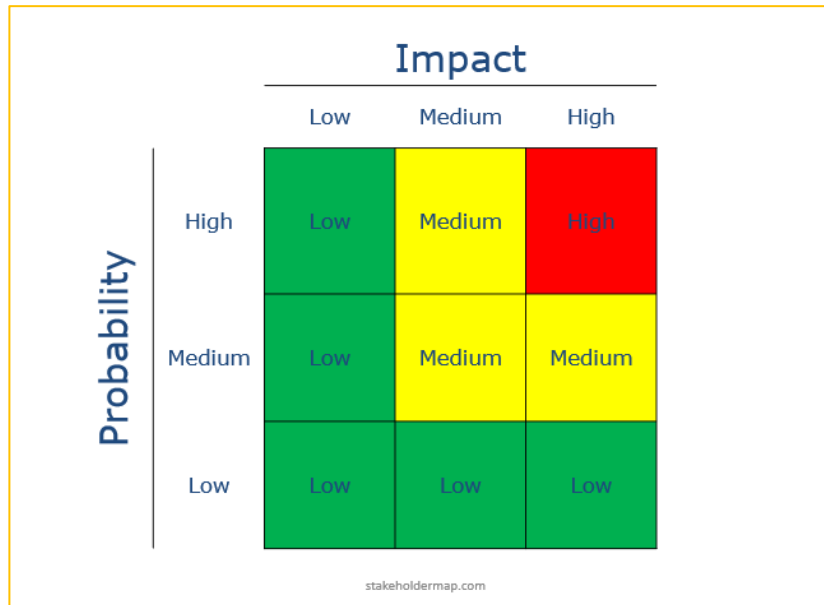
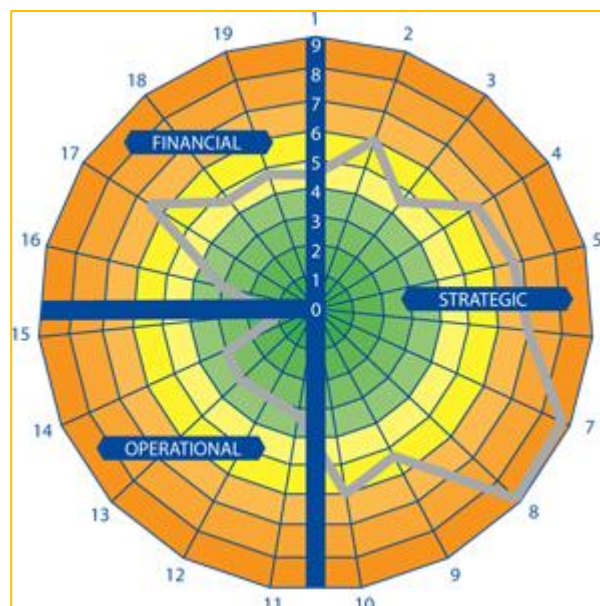


Figure 14: Risk Radar



5. Step 5: Risk Management

The main objective of risk mapping is the establishment of an action plan, which is essentially based on the recommendations arising from the identification, assessment and prioritization of the different risks.

The consolidated evaluations of Step 4 should then automatically indicate the risks that need the most attention. Often, in the event of these most serious risks, the introduction of

simple processes to limit exposure to these risks is a key part of risk management. In other words, the aim of risk mapping is to reduce the high or critical residual (net) risks and bring it into a lower level acceptable to managers. Quantitative measures that can be carried out on a regular basis and reporting systems are developed to address these most important risks on a timely and regular basis.

6. Step 6: Risk Revisiting

Some entities believe that it would be more cost-effective, to put in place a full risk monitoring and management systems; only for the most serious risks. But as market change evolves continuously, the low-risk position of yesterday can quickly become a high-risk position tomorrow, as a result, the previous steps must be repeated and updated regularly to ensure that key risks are properly managed.

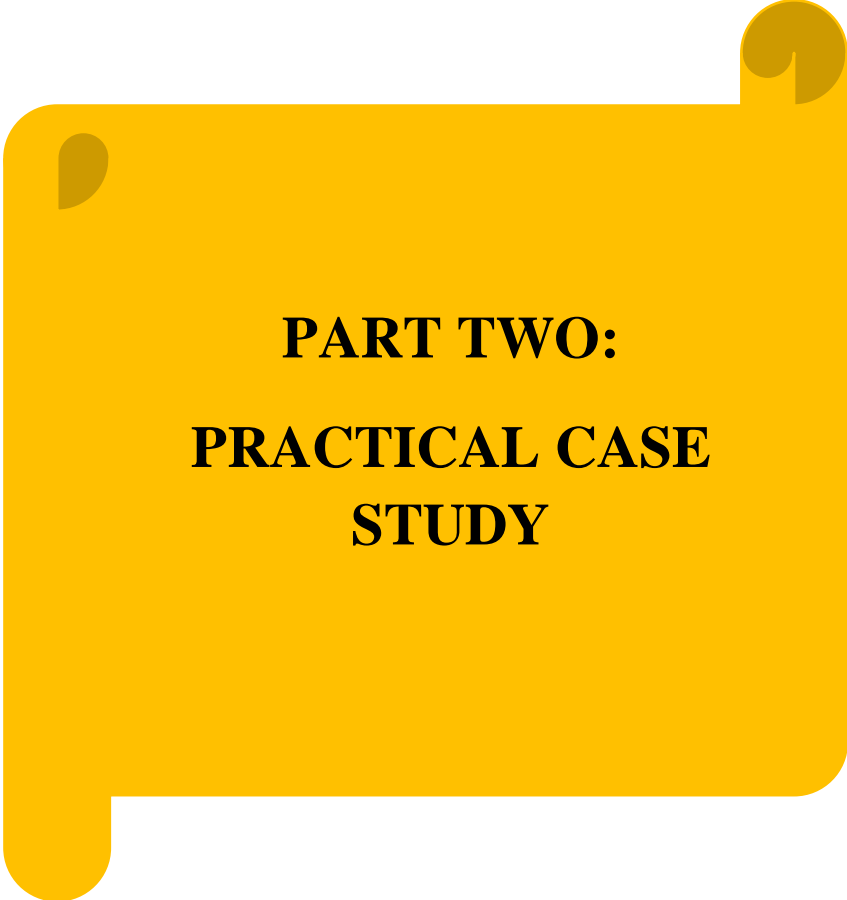
Each period management will review what has happened in the recent past and assess whether the risk management efforts have produced the expected results or failed at it, as well as assess what changes have taken place in the markets and around the world that could change its view of the risks or have a negative impact on the company. This could be concretized by establishing an incident database. Then it is ready to start the process again from Step 1.

Reporting all the information that the manager communicates at a higher level makes it possible to consult regularly on faults in the risk management system to help managers measure the level of performance.

CONCLUSION

Risk mapping is a formalized process, it is based on all of the following stages: identification, understanding, evaluation, prioritization, management and revisiting of risks, regardless of the approach adopted in the design and implementation of these measures.

Indeed, the nature of the insurance company's activities and their complexities condition the level of requirement in terms of risk assessment. The choice of the appropriate approach in the development of the mapping acts in perfect correlation with the objectives expected from the implementation of this system. Methods and tools for mapping may vary depending on the area of the covered activity.

A yellow sticky note graphic with rounded corners and a tab at the top right. The text is centered on the note.

**PART TWO:
PRACTICAL CASE
STUDY**

CHAPTER THREE

FRAMEWORK AND

METHODOLOGY

OF THE STUDY

CHAPTER III: FRAMEWORK AND METHODOLOGY OF THE STUDY

The first two chapters presented the conceptual and theoretical framework of risk mapping. This chapter will then present the framework of the study and the approach used in the development of this mapping.

The success of risk mapping depends on a clearly established methodology and a systematic approach that guarantee the objectivity of risk identification, assessment and treatment. Indeed, risk mapping is part of a dynamic vision; it is a living process:

Our internship took place within our sponsoring company “The National Insurance Company”, and lasted for six weeks; during which we tried to set up a risk mapping of the Motor insurance business line. It must be said that the limited duration of our internship as well as the current sanitary situation could have affected the quality of our study.

The objective of this chapter is first to present SAA and the Motor insurance division in order to clarify the framework of this study. The rest of the chapter will then explain the followed work methodology.

SECTION I: PRESENTATION OF THE STUDY FRAMEWORK

Through this section, we will give a brief presentation of the hosting company, its history and evolution, then we will give a detailed presentation of the Motor division activity to insure a better understanding of the context.

1. History and evolution of the company

The National Insurance Company has been operating in the Algerian market for over 50 years since its foundation in the aftermath of the independence in 1963.

The company witnessed several switches in its activity along with the changes in the economic orientations of the country; starting by the establishment of state monopoly on insurance operations in 1966, to specializing in Individual/Professional Risks in 1976 and ending up with the lift of the specialization of public insurance companies in 1990.

The Company succeeded in maintaining its position as the leading insurer in the Algerian market for decades; in terms of both; results and financial capacity, and that is thanks to its commercial network, which is considered today as the largest one in the country (520 insurance agencies and 15 Regional Offices throughout the national territory)

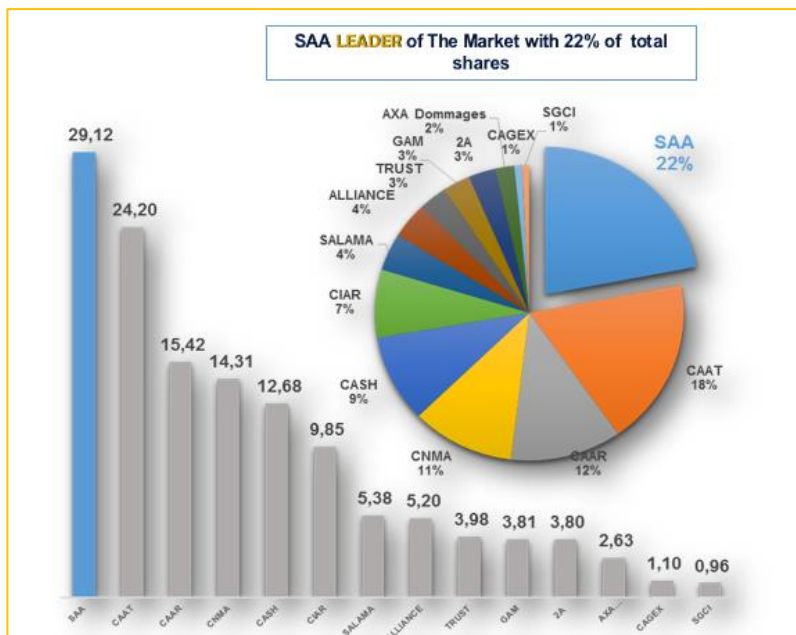


SAA presents the highest indicators of the market to look forward to the future with serenity:

- Equity capital: 34 billion DA equivalent to 310 million US \$
- Investments: 46 Billion DA equivalent to 420 Million US \$
- Real estate assets: 29 billion DA equivalent to 265 million US \$.

1.1.SAA in the Algerian Market

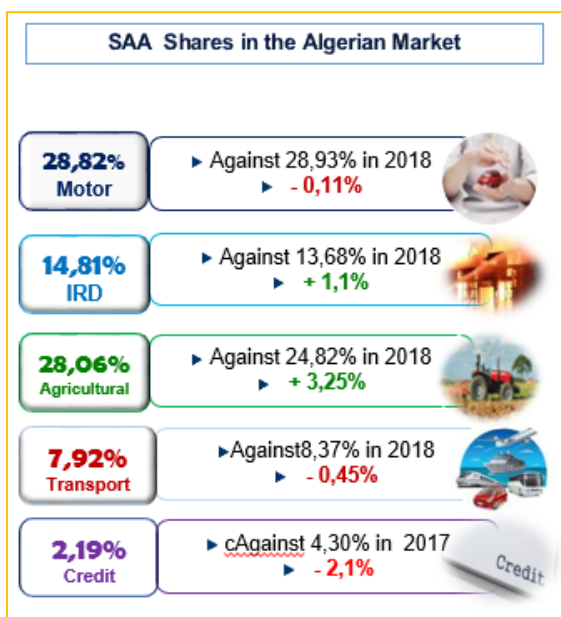
Figure 15: SAA Market share 2019



In 2019, The SAA remained on top of the insurance sector and that is by holding 22% of the market total shares and keeping its positing as leader of the market among 14 companies.

(Source: SAA annual report, 2019)

Figure 16: SAA Market shares by Insurance business line

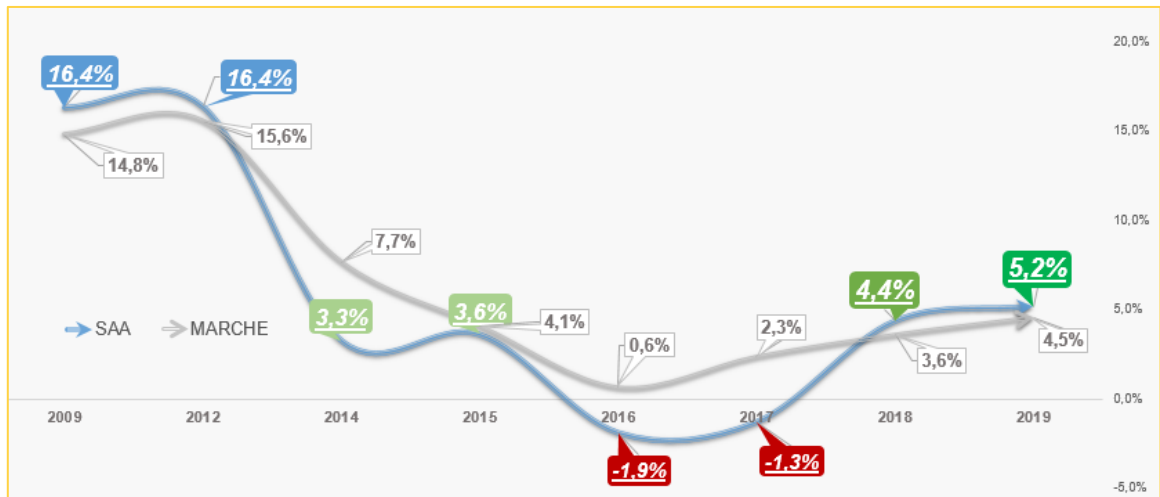


The company showed some very satisfying evolution figures in 2019 compared to the previous year, especially in Agricultural insurance wich grew by +3,25% while figures showed a slight decrease in motor, transport and credit insurance.

(Source: SAA annual report, 2019)

After suffering the market and its variations, and having a slower growth rate than the latter, just in the right periods, the SAA returns to its historic position as locomotive of the market with higher growth rates than the market for 2 years.

Figure 17: SAA growth VS Algerian Market growth



Source: SAA annual report, 2019

1.2.SAA at the regional level

According to MENA Insurance Directory 2017 data, SAA in the Middle East and North Africa area is:

- ✓ The 15th most capitalized insurer (equity),
- ✓ The 18th in terms of net income,
- ✓ The 29th largest insurer in terms of turnover.

In the Maghreb area

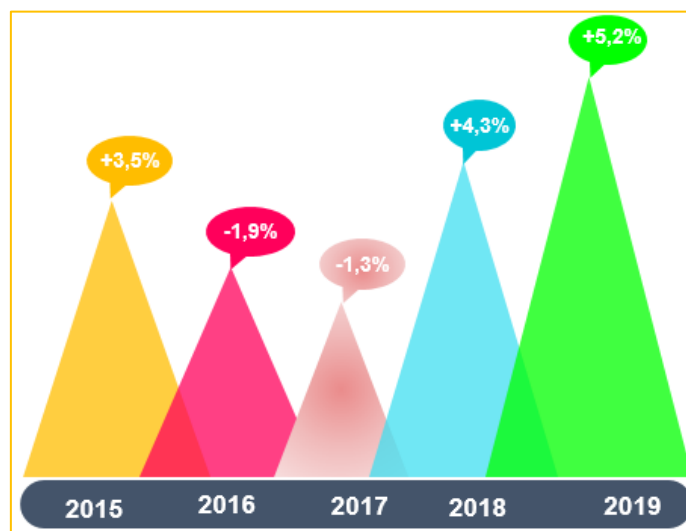
- ✓ The 5th most capitalized insurer,
- ✓ The 6th in terms of net income,
- ✓ The 8th largest insurer in terms of turnover.

1.3. Turnover Evolution

Figure 18: SAA turnover evolution

The total of premiums progressed in the last five years as follows:

- 2015 (+ 0,931 B Da)
- 2016 (- 0,523 B Da)
- 2017 (- 0,348 B Da)
- 2018 (+ 1,152 B Da)



Source: SAA annual report, 2019

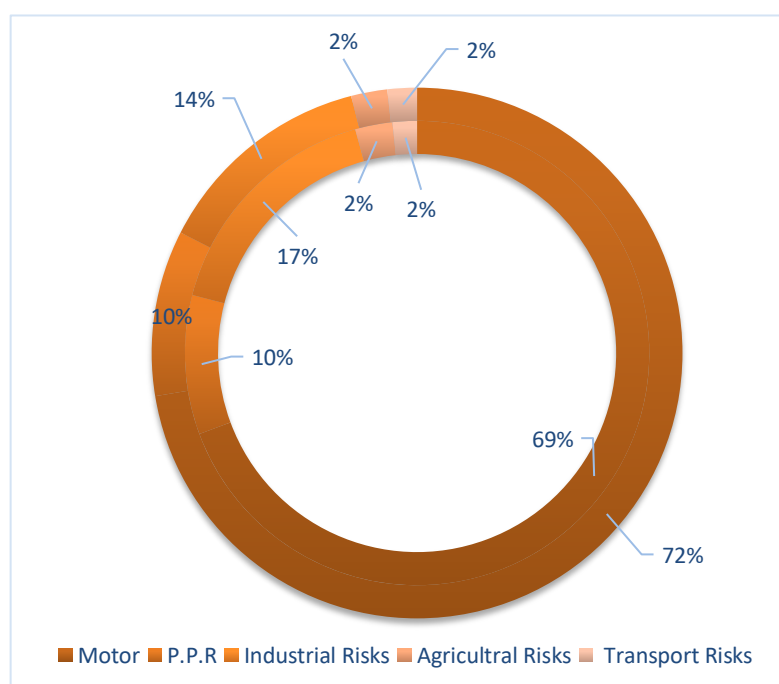
SAA ends the financial 2019 year, with a turnover of 29.11 Billion Dzd, with an evolution of 5.2%, that is + 1.44 Billion Dzd compared to 2018. In only two years the company has experienced an increase in turnover of 2.59 billion Dzd.

1.4. SAA Portfolio structure

Figure 19: Portfolio structure 2019 VS 2018

The evolution of the company's portfolio structure reflects the achievement of the current strategy goals, As we can see:

A decrease in the Motor share in the overall portfolio (69% in 2019 vs 72% in 2018) while maintaining the



turnover of this business line

- An improvement in the other risks, in particular industrial (14% in 2019 vs 17% in 2018) and a slight rise in agricultural risks.

2. Presentation of the Motor division

The “Motor Insurance” Division includes three (03) central departments. The organization at the level of this division is defined by function:

- The "Production" or underwriting Department;
- The “Claims management” Department;
- The “Recovery Monitoring” Department;

The Division is responsible directly and indirectly for the turnover’s evolution of Motor insurance in different market segments mainly: companies, individuals and professionals.

The division is also responsible for monitoring and maintaining the portfolio's balance, monitoring and managing claims as well as the smooth running of central and decentralized structures involved in managing Motor insurance.

It is also responsible for technical management, risk selection, and, therefore, the technical balance of the policies in the business line

2.1.Motor portfolio structure

2.1.1. Overall

Table 7: Motor Portfolio structure(2019 VS 2018)

(In million DZD)

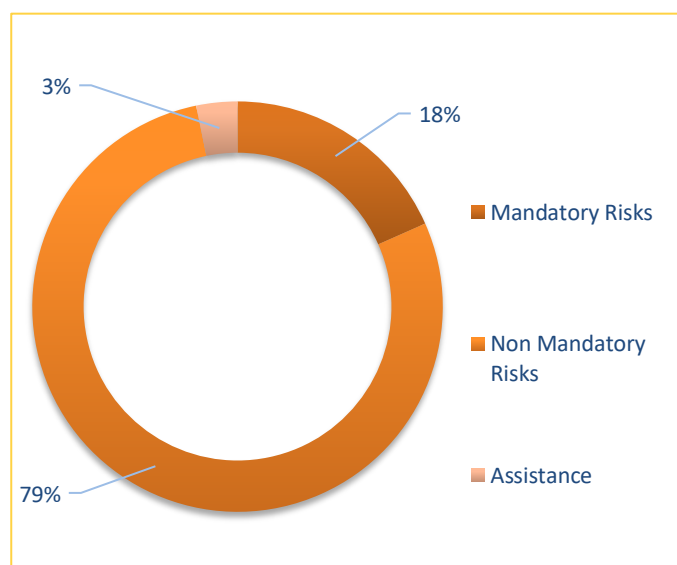
Business line	On 31/12/2019		On 31/12/2018		Evolution (2019/2018)		%	
	Number	Amount	Number	Amount	Number	Amount	Num	Amt
Mandatory Risks	1 916 160	3 714 107	1 954 191	3 640 578	-38 031	73 529	-2%	2%
Non Mandatory Risks	5 388 991	15 849 682	4 916 881	15 732 596	472 110	117 086	10%	1%
Assistance	597 309	655 324	617 618	665 047	-20 309	-9 724	-3%	-1%
Total	7 902 460	20 219 112	7 488 690	20 038 221	413 770	180 891	6%	1%

Source: Motor division annual report 2019

Overall, the business line recorded an evolution of around 1% on 31/12/2019, with a surplus of 181 million DA this performance comes mainly from non-mandatory risks, and precisely from the new released coverages by the company.

Figure 20: Motor Portfolio structure (mandatory and non-mandatory)

By type of risk, those mandatory reached a level of 3.71 billion DA, an evolution of 2%, while those non-mandatory recorded a premium volume of around 15.85 billion DA, compared to the same period of the preceding financial year, the rate of change is also 1%.



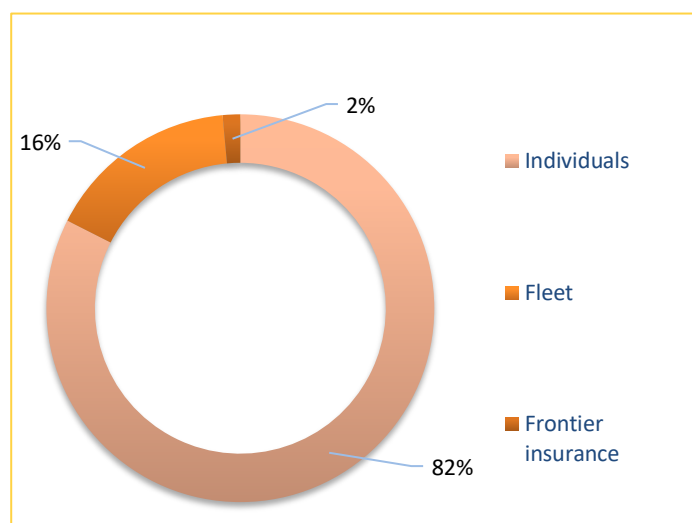
As for the assistance coverage, the turnover made on 12/31/2019 recorded a decrease of -1% compared to that recorded in 2018, a difference of -9.72 Million DA.

2.1.2. By segment

On 12/31/2019, the company generated 20,219 billion in net premiums against 20,038 billion in 2018; however, the number of policies signed fell by 38,045 or -2%. This decrease is mainly due to the “Individuals” segment.

Fleet insurance underwritings increased massively of around 13% generating thus a total turnover in this segment of around 3.25 billion DA.

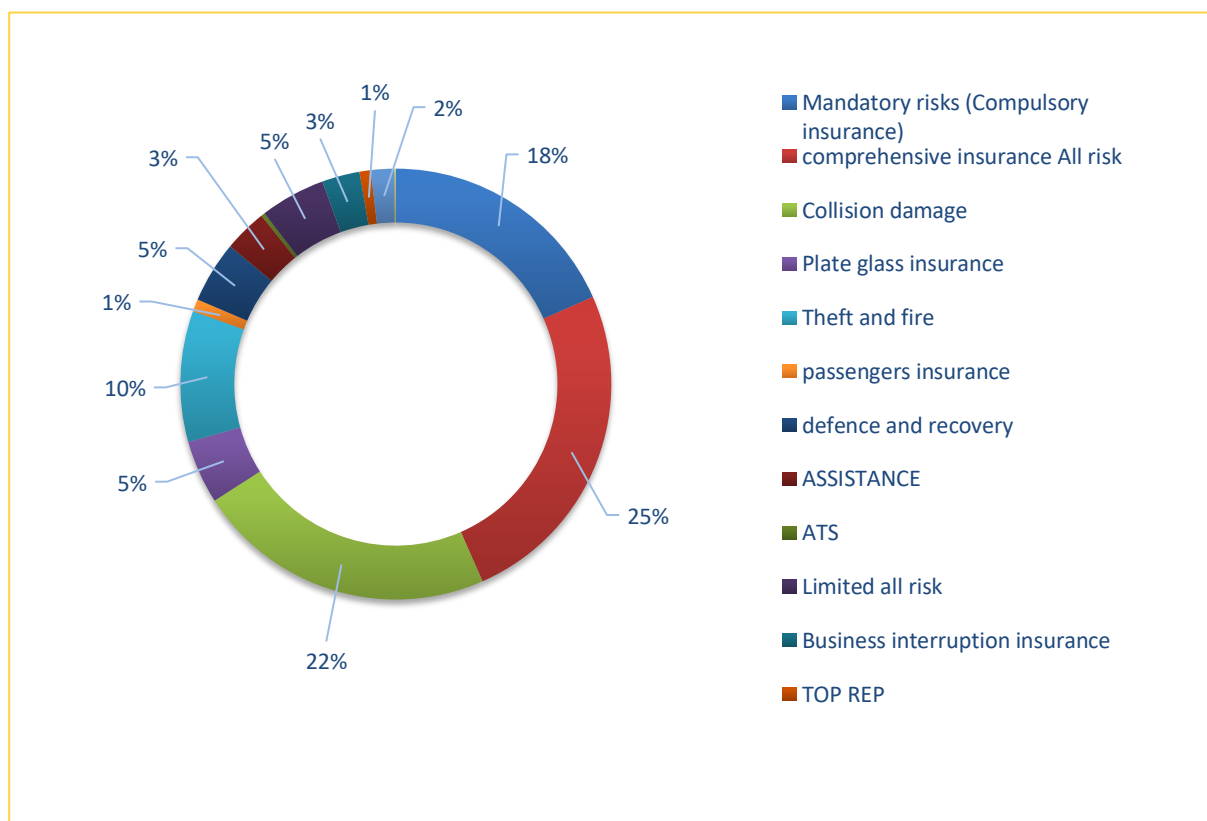
Figure 21: Portfolio structure by segment



This performance is the result of the considerable efforts made by the SAA for large companies (GTA Group, Algérie Poste, Net-Com, etc.).

2.1.3. By coverage

Figure 22: Motor Portfolio structure by coverage



On 12/31/2019, the business line recorded a turnover of 20.22 billion DA against 20.04 in 2018, a positive difference of 254 Million DA, which translates into a positive development of 1 %.

Note that the year was characterized by several events such as the launch of two (02) new coverages, namely: “Earthquake” and “Riots, and civil commotion” which generated an additional premium volume of 23.37 Million DA; and the signing of several partnership agreements (Renault, Peugeot)

2.2.SAA insurance products

Motor insurance in Algeria is governed by; Law 06/04, of February 20, 2006, modifying and completing ordinance 95-07 relating to insurance and Ordinance 74/15 on compulsory motor insurance and the compensation scheme for victims amended and supplemented by Law 88/31 of 19/07/1988

The Motor insurance policy can be offered to any owner or driver of a land motor vehicle, in the form of a package that must include civil liability insurance coverage and one or more other optional or non-mandatory coverages:

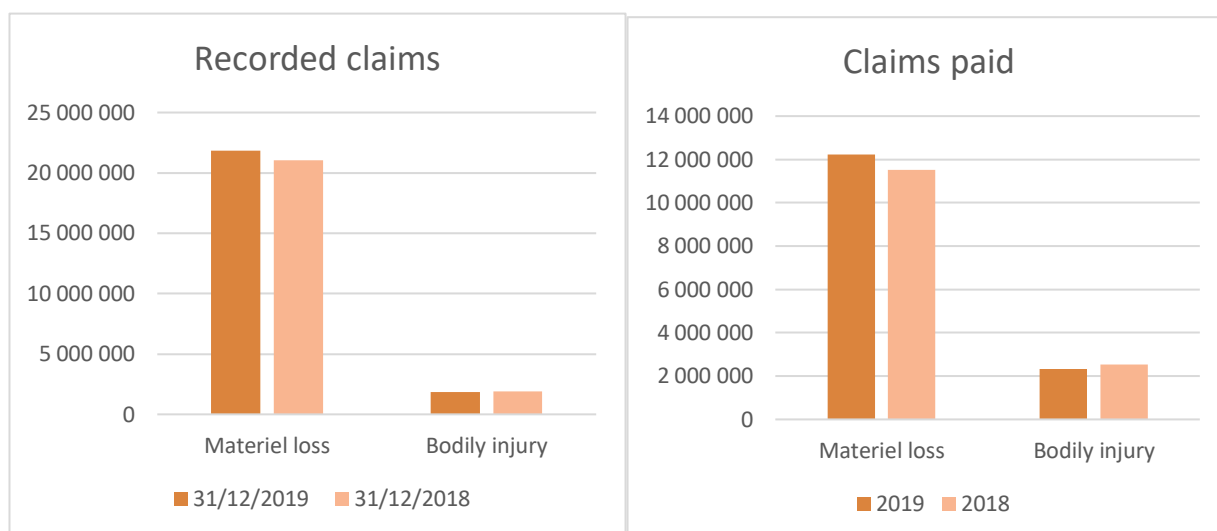
- Vehicle own damage insurance
- Damage to transported people (passengers);
- Defense and recovery or legal protection;
- Assistance.

The company has redesigned the Motor insurance policy and built an offer that optimizes the extent of the coverages and the price for individuals by introducing new formulas, namely:

- The DASC (All risks)
- The DASC limited to (200,000 DA, 300,000 DA and 500,000 DA) limited all risks.
- The AL WAFAB Pack
- The LAHBAB Pack
- The LALLA Pack

It also made special offers to meet the needs of large, small businesses and professionals in terms of coverage.

2.3.Motor Claims management



On 12/31/2019, we recorded an evolution in the total amount of claims reported at a positive rate of 3% to reach 23.64 billion DA

On 31/12/2019, the company recorded a total compensation amount of 14.55 billion DA against 14.05 billion DA on 31/12/2018; the amount of settlements is divided between 12.22 Billion DA for materiel losses and 2.32 billion DA for bodily injury claims.

SECTION II: METHODOLOGY OF DATA COLLECTION AND CHOICE OF MAPPING

To guarantee the expected results and in order to finish with an exhaustive risk mapping, we proceeded with our internship on the three different levels of the company, respectively, the Motor division in (the headquarter), the regional office, and the agency.

This section is devoted to set the adopted approach in our risk mapping. All the carried out steps were achieved by using several data collection techniques.

1. The risk mapping choice

Considering this exceptional sanitary situation; due to COVID-19 pandemic; the time constraint, and the limited means; we opted for thematic mapping, in which the mapping

scope is more limited to the technical activities of the Motor business line, it has the advantage of greater precision as well as a more flexible management.

Meanwhile, it suffers from the absence of global mapping's global risk vision that requires a lot of time and resources to identify all the risks related to the different insurance company activities

To this end, we have delimited our study on the encountered risks by SAA in the Motor insurance business line. This choice is motivated by the importance of this segment within SAA. In addition, the main objective of carrying out this mapping is to improve the profitability of the business line.

Therefore, a poor risk assessment can generate a technical imbalance and can affect the profitability of the business line because, like any business line of insurance, Motor insurance is highly exposed to operational risk.

2. The choice of mapping approach

As discussed in the previous chapters, three approaches are possible when it comes to risk mapping; we went for the combined approach so a better risk identification, assessment and treatment is insured.

First, we adopted a top-down approach to cover the maximum spectrum and then complete it with the bottom-up approach to fine-tune our quest.

2.1.Data collection tools

The use of a large volume of information is necessary for the success of our mapping. To do this, we have opted for several collection techniques such as:

2.1.1. Observation

The understanding of the proper functioning of each of process, which are involved in the management of the Motor insurance business line, can be ensured by the careful observation. It allows the gathering of essential information to identify the problems that may arise during the management of policies and claims from policyholders and the company's network as a whole.

2.1.2. Interviews

In the absence of incidents database, this technique is qualified as the most reliable one for the identification of the business line's key processes in addition to the risks that may affect the achievement of the each process's objectives. The interviews were carried out with:

- The Head of Division
- The Heads of Department (Production, claims management, recovery monitoring) as well as their teams.
- The Head of control structure
- The Head of one of the agencies

The course of these interviews took the following form:

- The setting in situation: It is done through the presentation of the interview topic by explaining the context of work, and the precision of the expected return. It is essential to build a relationship of trust with the interviewees to guarantee better feedback and reliable answers. This is reflected by the distinction between the audit approach and the risk management one which, by guaranteeing the anonymity of the responses, aims to help the company to manage anomalies that can influence the achievement of objectives.
- Retrospective analysis: Based on the experience of interviewees, we will be able to identify the risks that can influence the smooth running of the activity thanks to a detailed description of the processes in question. We will also be able to identify the implemented control elements by SAA management to deal with each risk.
- Projecting into the future: Experts in the field are the most qualified to provide recommendations on the actions deemed useful to implement to better manage these risks. Based on these recommendations the development of a performant action plan is facilitated.

2.1.3. Development of survey

Using google forms, a survey was distributed to all the company's network and destined to Motor managers (responsible and operational), this allowed us to build a database that groups together all the risks and their evaluation grid as well as the analysis of the performance of the control elements

The survey constitutes a great tool to identify the causes and the consequences of each risk; by knowing the origin of risk we will be able to suggest the proper remedy in order to eliminate it or reduce its criticality or frequency

2.1.4. Documentary analysis

This analysis is based on the internal documents of the SAA. It must be noted that the control structure documents, served as a very important base in our mapping, the anomalies detected and reported by controllers during their control missions allowed as to identify a long list of risks as well as their frequency. It allows the confirmation or not of the information which were collected from interviews.

This analysis was run mainly relying on:

- Organizational chart of the Motor division
- Manuals of procedure
- Motor activity notes and circulars
- SAA activity report

2.1.5. Process mapping

The approach consists of identifying everything that could prevent the achievement of the process's objectives while choosing the appropriate level of granularity. It is, therefore, necessary to have, for each key process, a clear vision of the tasks and objectives and expected performance criteria.

The mapping of the different processes must give a transversal and global vision of the company and make it possible to identify clearly and precisely the risks associated with its objectives.

SECTION III: THE ADOPTED APPROACH IN THE RISK MAPPING OF THE MOTOR INSURANCE BUSINESS LINE

The goal of this section is to explain the adopted approach in our risk mapping, by following the steps that were already discussed in the previous chapters. The different stages of risk mapping can be summarized as follows:

Figure 23: Risk mapping stages



1. Risk identification

In order to identify the risks that may arise during the exercise of Motor insurance activity; we started first; with a series of individual interviews with central managers (owners of the processes) and the head of division. We proceeded in a detailed process mapping so that we will be able to identify the risks that arise from each process in the second place.

Multiple brainstorming sessions were scheduled with the managers of each process in order to identify the maximum possible risks as well as with the control structure.

Several modifications affected the content of the survey that was distributed for all the network by the end. These changes took place in collaboration with the central managers in order to ensure a better comprehension and evaluation by the network

We carried out with our internship at the regional office level and the agency by applying the same approach described above.

We proceeded to sort and classify the identified risks, according to IFACI workgroup nomenclature, into four main families of risks, namely: financial, insurance, operational, and strategic and environmental risks. Each risk family is detailed in three levels of precision, and each level has its own nomenclature.

2. Risk understanding

After having identified all the risks, we found it very necessary to actually understand the risks that we are dealing with, and that is done by the deep analysis of the different causes and consequences of each risk to end up with a better risk comprehension.

3. Risk assessment and risk management

3.1. Risk Assessment

We used the responses to the survey and the interviews as a basis for assessing the probability of occurrence (frequency) and the severity of each risk; we tried to ensure the reliability of this evaluation as much as possible through the recurrence of these anomalies according to the control reports

Before determining the gross risk, and in order to assess the risks of the insurance company, a scale for measuring the probability of occurrence and a scale for the impact of risk were defined.

- Scale of probability of occurrence (frequency)

Risks are classified according to their probability of occurrence based on a scale of five levels as follows:

Table 8: Frequency measuring scale

Scale	Probability of occurrence	Calendar Exposition
1	Impossible: the scenario is impossible	Once in a century
2	Highly unlikely: the scenario is highly unlikely and its occurrence is almost impossible	Once in 10 years
3	Likely: the scenario is possible and will likely occur in the short to medium term	Once a year
4	Likely: the scenario is possible and will likely occur in the short to medium term	Once a month
5	Very likely: the scenario is very possible and will often occur in the short term	once a day

- Impact scale (severity)

Risks are then classified according to the severity of their consequences on the achievement of the insurance company's objectives in term of both turnover and return on equity as well as conformity

Table 9: Frequency measuring scale

Scale	Probability of occurrence	Financial	Regulatory conformity
1	Not serious: the objectives are not affected	No decrease in turnover and ROE	Monitoring, analysis and regulatory compliance
2	Not very serious: non-determinable deviation from objectives	Decrease of turnover $\leq 1\%$ Decrease in ROE $\leq 1\%$	Non-permanent regulatory watch
3	Moderately severe: objectives are not significantly affected	Decrease of turnover $> 1\%$ et $\leq 5\%$ Decrease in ROE $> 1\%$ et $\leq 3\%$	Lack of systematic regulatory watch and non-compliance with some rules and laws
4	Very serious: lastingly	Decrease of turnover	Total absence of regulatory

	affects the achievement of a strategic objective	> 3% et =< 15% Decrease in ROE > 3% et =< 10%	monitoring and non-compliance of several rules and laws and infringement of an activity of the insurance company.
5	Catastrophic: the company's survival is threatened, the financial impact is problematic	Decrease of turnover > 15% Decrease in roe >10%	Total absence of regulatory monitoring and non-compliance with rules and laws that are critical to the company's activity and objectives. The survival of the company is threatened

Once the gross risk has been determined, it is necessary to calculate its criticality, Multiples possibilities emerge.

$$\text{Criticality} = \text{Frequency} \times \text{Impact}$$

Considering the need for net or residual risk assessment, we transformed the criticality matrix into a scale or a correspondence table, so that we can switch the quantitative scale into a semi-quantitative one as demonstrated in the scale above the following matrix

Table 10: Gross risk matrix

		1 to 4	5 to 9	10 to 14	15 to 19	20 to 25
		Weak	Moderate	Strong	Very strong	Catastrophic
		Criticality				
Frequency	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		Severity				
		1	2	3	4	5

3.2.Risk control elements

The assessment of the existing level of risk control is based on the responses from the various interventions .For risk control; or the existing risk management system two criteria's are distinguished:

- Relevance: it measures the ability to really reduce the risk. The relevance rating scale is summarized as follows

Table 11:Relevance scale

	Level
5	Inadequate
4	Improvable
3	Medium
2	Relevant
1	Very relevant

- Efficiency: it is more easily measured and it matches the completion of the action. The efficiency rating scale is summarized as follows :

Table 12: Efficiency scale

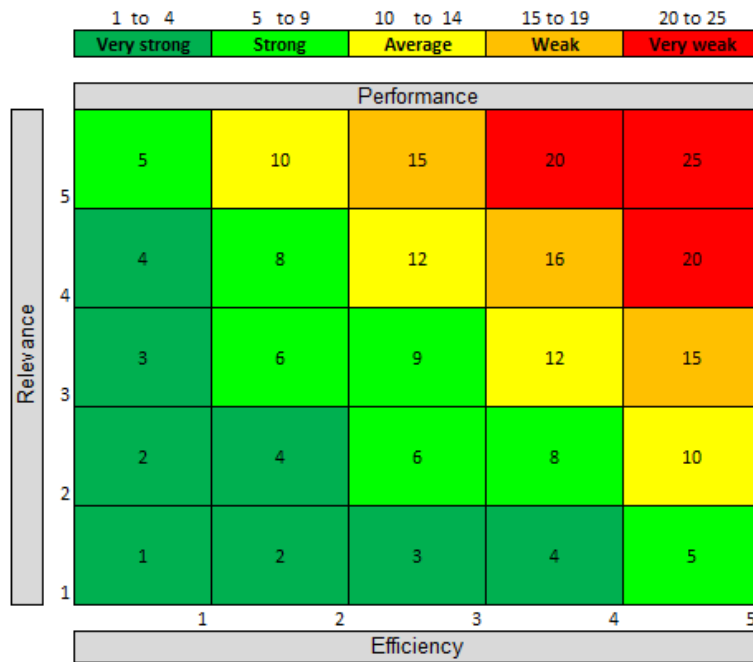
	Level
5	Not piloted
4	Action plan being defined
3	Action plan defined
2	Production of action plan
1	Very relevant

The expected performance of the existing action plan or the control elements is obtained by the combination of these two criteria's

$$\text{Performance} = \text{Relevance} \times \text{Efficiency}.$$

The performance of the existing risk management system or the control elements is determined also in shape of a matrix that needs to be transformed into a scale to allow the net risk assessment.

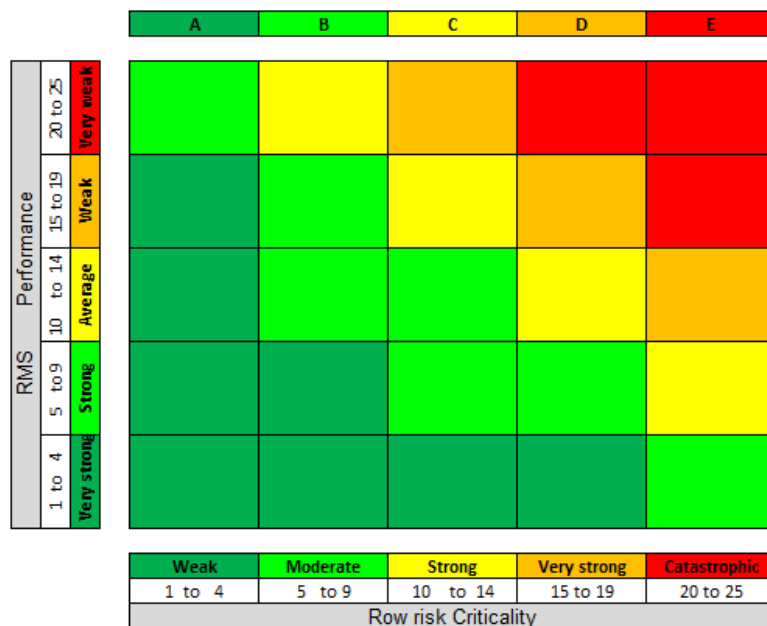
Figure 24: Control elements matrix



3.3.Net risk assessment

The net risk is assessed by associating the gross risk conversion matrix with that of the Risk Management System, which results in the following net risk matrix

Figure 25: Net risk Matrix



4. Risk prioritizing

Zone A

Risks deemed acceptable with a weak criticality and a weak to very strong control elements.

Zone B

These acceptable risks have a moderate criticality a weak to a strong level of criticality with a weak to strong risk management system.

Zone C

These risks can have a strong impact on processes due to their relatively strong criticality and they are associated with an average control performance

Zone D

These risks are very strong considering their criticality levels and the average to weak control elements they have

Zone E

These risks are catastrophic and can seriously affect the activity, or even have influence on the whole company. They are characterized by a catastrophic criticality and faulty control elements. These risks must primarily concentrate on the actions to be undertaken

5. Risk management

The purpose of our mapping is not only the prioritization of the identified risks, but it is the suggestion of an action plan for all the risks that must be remedied as soon as possible.

As a result, it is essential to estimate the efficiency of these action plans, by respecting the cost of risk treatment on the cost of risk in order to make the appropriate decisions.

In view of the previous, we will suggest the recommendations that we see most suitable all risks will be addressed in order of priority, starting with those deemed most critical in order to eliminate or minimize their occurrence or smooth their impacts

The possible strategies that can be used to limit the frequency and impact of risk and are summarized as follows:

- Prevention
- Acceptance
- Transfer
- Avoidance

6. Risk revisiting

The risk mapping that we attempt to put not must be developed later on, in a way that makes it as exhausted as possible, the mapping process should be updated regularly along with the appearance of new processes, new anomalies and any possible malfunctioning's in order to have awareness of any potential risk and manage it systematically.

Key risk indicators as well as Key performance indicators are great indicators when it comes to assessing risks, their evolution gives a clear vision about the way that the company is handling its risks.

CONCLUSION

After presenting the framework of this study in the first section, and the devotement of the second one to explain the methodological framework of our work, the so-called "preparation" phase in which we focused on the techniques of data collection and on our choices as well as to the scope of study is insured

In a final section, we determined the different steps that are necessary for developing the risk map.

The following chapter is reserved to the formalization and the concretization of the risk mapping methodology within the Motor business line of the national insurance company.

**CHAPTER IV:
SETTING UP A
RISK MAPPING OF
THE MOTOR
BUSINESS LINE
WITHIN SAA**

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

The various interviews that we had with the Motor division staff allowed us to identify the processes related to the business line activity. Indeed, we distinguish three main processes, which are respectively:

- Production process (underwriting)
- Claims management process (material and bodily injury)
- Recovery monitoring process

All these processes are detailed in appendix 2; their aim is not only to serve as a basis for process mapping; by indicating more details about each process as well as their objectives. But also as a basis for identifying the various risks likely to be triggered each time a task is carried out; and the dysfunctions that can restrain the achievement of these objectives.

However, it should be noted that our study is mainly based on interviews with managers and their collaborators, the review of the control reports that are related to the business line and a summary of the recurrent and the non-recurrent anomalies, in addition to the careful observation of the various performed tasks in the different hierarchy levels.

SECTION 1: RISK IDENTIFICATION

We proceeded in the identification of the different risks according to the following approach:

First, we identified the potential risks that are likely to manifest or occur during each activity or task for each process.

Secondly, we carried out a grouping or a classification of these risks according to the nomenclature offered by IFACI work group, which divides the risks into four main categories of families: financial, insurance, operational, environmental and strategic risks. Moreover, in order to make our study more structured and detailed we went with a finer classification of the risks according to this terminology (three risk levels). It must be noted that this terminology is largely inspired by the ISO 31000 standard related to risk management.

This phase lead into the identification of level 3 risks (according to the IFACI nomenclature). The table that shows the classification according to IFACI as well as the analysis of risks is detailed in appendix 3

1. Identification of financial risks

Because we are developing a risk mapping for only one insurance business line of, and not for the entire company, we were able to identify only three possible financial risks related to the Motor activity. These are qualified respectively as; as treasury risks; the non-recovery of premiums and claims settlement for the benefit of policyholders with unpaid premiums, and imperfect hedging risk.

2. Identification of insurance risks

For this category, we succeeded in identifying a number of risks that has a direct influence or impact on the Motor insurance activity itself. Some risks are imposed and we do not have control over them; such as the administrated pricing of the civil liability; which is the reason why this coverage is not profitable.

Others are related to underwriting risks, while others translate the importance of the settlements to be paid and are subject to external factors or hazard. Finally yet importantly, the risks related to provisions so that the company can honor its engagements toward policyholders.

3. Identification of operational risks

The total risks that are qualified as operational constitutes the share of lion in our risk mapping. Based on the several interviews that we had as well as the survey that were diffused, we were able to identify several serious malfunctioning.

The non-respect of the pricing policy by the underwriting agents revealed the existence of multiples risks that leads to underpricing or overpricing of the risk, the non-compliance with procedures especially those related to the recovery and claims management process; are causing the company supplement fees that can be simply avoided. Some deficiencies in control procedure can be improved to ensure better results, deadlines and obligations towards clients can be managed in a better way especially those related to claims management weather if this failure is resulting from poor suppliers services (loss adjustors) or from the claims management agents.

Some fraudulent acts were recorded mainly from clients; to benefit in an illegal manner from their insurance policies; by faking some declarations. Some loss adjustor were also involved in this kind of practices with the complicity of claims managers and policyholders.

Some internal fraud acts committed by staff members were also detected and needs to be treated as soon as possible.

This year was marked by the appearance and the spread of the COVID 19 pandemic, which had serious impact on the insurance industry performance all over the world and showed the importance of making some necessary changes in order to face this kind of unexpected situations.

4. Identification of strategic and environmental risks

During the identification step, we focused on a risk that results from the continuous evolution of the insurance market, and which can arise following the appearance of new laws or regulations, and their application such as the introduction of the new pollution tax on vehicles and rolling engines.

The company relies on market practices and competitive trends to decide what to offer to the client. This approach reduces the risk of non-competitiveness of the company's tariffs, but in return entails the risk of a lack of profitability of the offer.

It is very important that these risks are properly understood during this step, a detailed analysis of these risks is presented in appendix 3 and that is based on the identification of the causes or the origins of each risk as well as the related process, their consequences if they materialize and which axe of value they would influence.

SECTION II: RISK EVALUATION

After identifying and classifying the different risks that are faced by the company, the next step consists of assessing them according to their criticality as mentioned in the previous chapter, and evaluating the risk management system related to each risk according to their performance.

1. The Risk journal

The assessment is displayed through the risk journal that demonstrate the prioritization of gross or raw risks from the most critical to the least critical as well as the evaluation of the associated management actions to each risk. These control elements are detailed in appendix 4

A risk code was given for each identified risk, this risk code was defined based on the main categories of risks according to IFACI risk inventory by adding a number in the end of the code to express more detailed level of risk. The same code was giving to the risk management actions associated to the risk in question

This phase is the key to hierarchies our raw risks according to their criticality on a risk matrix and the same thing for the elements of control

The assessment of the gross risk based on the frequency and the severity, as well as the evaluation of the performance of the control elements based on their relevance and efficiency allowed us to have the following results:

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

Risk code	Risk	Criticality	RMS code	Performance
R20102	administrated rating of the civil liability coverage	Catastrophic	S20102	Very weak
R40101	Risks resulting from market pressure to apply low tariff rates	Catastrophic	S40101	Very strong
R301212	Non-application of penalty	Very strong	S301212	Average
R301214	Non update of capital	Very strong	S301214	Strong
R302021	Non-execution of recovery	Very strong	S302021	Average
R302111	Slowness of processing	Strong	S302111	Very strong
R30209	Missing claims files	Strong	S30209	Very strong
R103011	non recovery of premiums	Strong	S103011	Very strong
R20302	Peak loss frequency risks	Strong	S20302	Very strong
R20403	Risks relating to the amounts of provisions for claims	Strong	S20403	Very strong
R301213	Non application of additionnel premium	Strong	S301213	Strong
R302221	Unintentional loss adjustor error over / underestimation of damage	Strong	S302221	Very strong
R307012	Loss prior to the inception date of the policy	Strong	S307012	Very strong
R307013	Declaration of false circumstances of the accident	Strong	S307013	Very strong
R302223	Slowness of the appraisal	Strong	S302223	Very strong

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

R307011	Underinsurance (of capital to be insured : value of the vehicle) willingly	Strong	S307011	Strong
R20303	Risk of cumulative claims	Strong	S20303	Very weak
R40102	Competition risks: no recovery of Civil liability	Moderate	S40102	Very weak
R30233	Risks relating to the VAT system and its invoicing	Moderate	S30233	Very strong
R30225	favoring of the weak party of the policy by the judges	Moderate	S30225	Very strong
R30603	settlement of uncovered and fraudulent claims willingly	Moderate	S30603	Very strong
R301215	wrongly given discounts	Moderate	S301215	Strong
R302271	granted refunds without the prior consent of the RO	Moderate	S302271	Very strong
R103012	Claims settlement for the benefit of customers with unpaid premiums	Moderate	S103012	Very strong
R30232	Ignorance of notes and circulars	Moderate	S30232	Very strong
R301211	Failure to comply with pricing parameters (fiscal strength)	Moderate	S301211	Very weak
R304151	break in knowledge transfer	Moderate	S304151	Very strong
R30305	computer failures	Moderate	S30305	Very strong
R20206	Risks of cancellation, termination, reduction	Moderate	S20206	Very weak
R302132	indemnity calculation error	Moderate	S302132	Strong
R30704	Other external frauds: Fraudulent appraisal	Moderate	S30704	Very strong
R302023	no proposal of amicable transaction	Moderate	S302023	Very strong
R30606	Theft and fraud - Theft / embezzlement	Moderate	S30606	Very weak

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

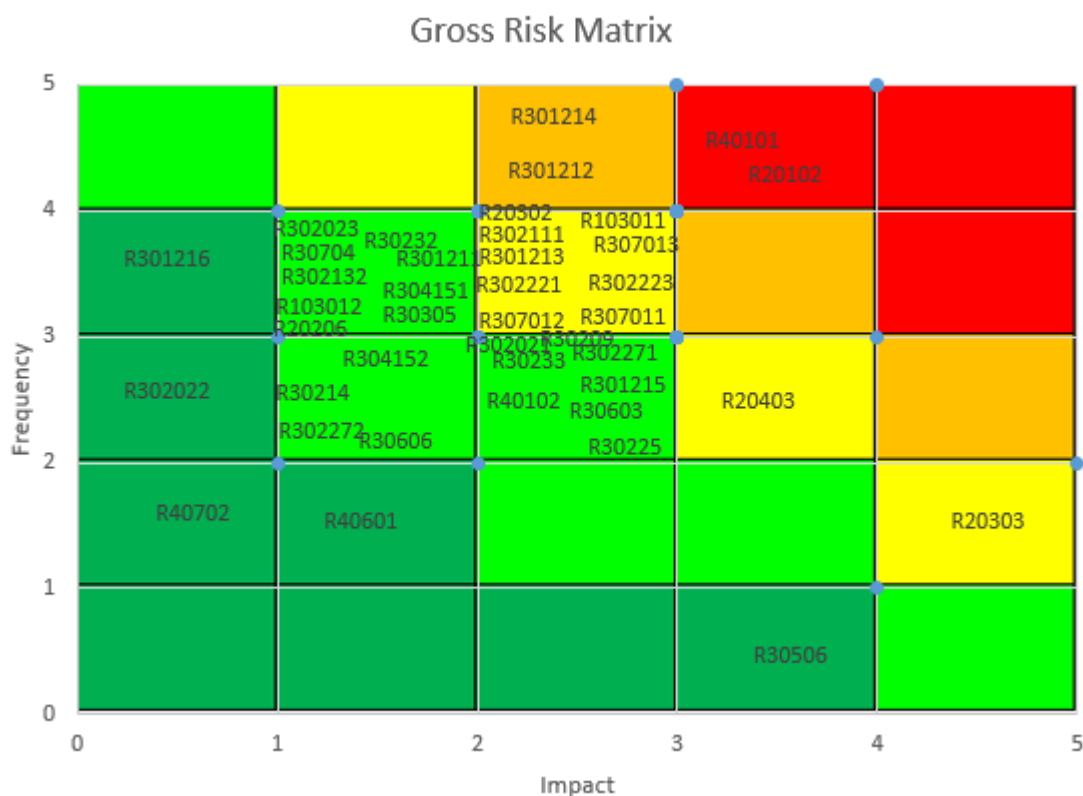
R302272	Non respect of settlement powers	Moderate	S302272	Very strong
R304152	work overload	Moderate	S304152	Very strong
R30214	refusal of the amicable transaction by the insured or the beneficiaries	Moderate	S30214	Very weak
R40601	Risks associated with the appearance of new laws or regulations, and their application (Vehicle and rolling engines pollution tax 2020)	Weak	S40601	Very weak
R301216	Non application of bonus	Weak	S301216	Average
R30506	Pandemic	Weak	S30506	Very weak
R302022	Non disburse of received Recovery	Weak	S302022	Very strong
R40702	Risks of civil war, riots, foreign war, terrorist attacks and terrorism	Weak	S40702	Very weak

2. Assessment Matrixes

2.1. Gross risk matrix

Based on the previous, the classification of our raw or gross risks on the risk matrix is giving as follows:

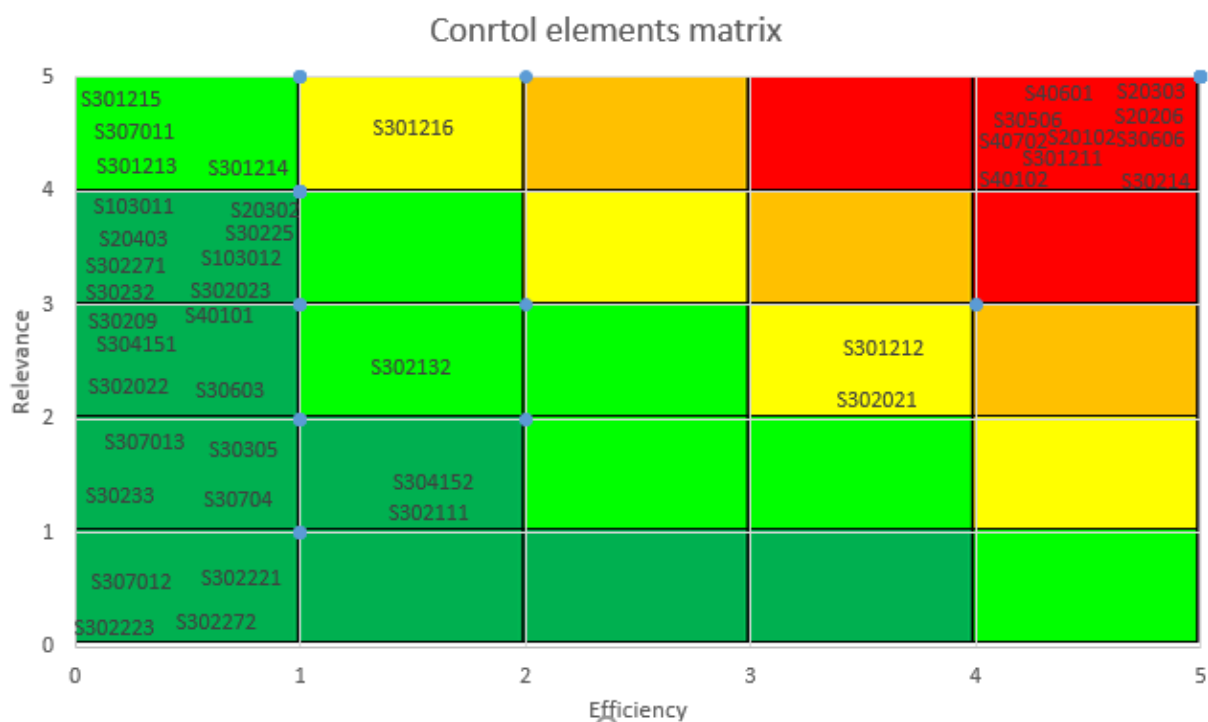
Figure 26: Gross risk matrix



2.2. Control elements matrix

The classification of our control elements on the risk matrix takes the following form:

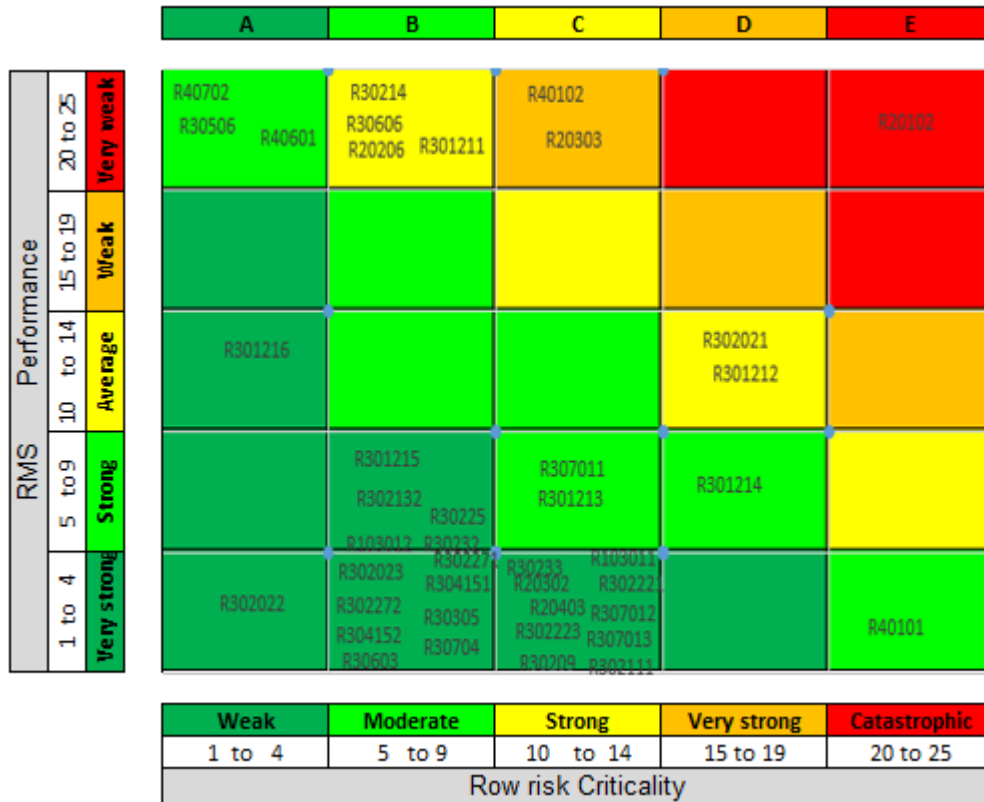
Figure 27: Control elements matrix



2.3. Net risk matrix

The combination of the two matrixes by transforming each matrix into a separate scale as showed above of each matrix will allow us to have a clear vision on the position of each net or residual risk on a third and final matrix as follows

Figure 28: Net risk matrix



So as it can be noticed, the passage from raw risk matrix to the net one has showed an important mitigation of some risks thanks to the performance of the control elements put in place by the company, while others were aggravated simply because of the absence of the attached control elements

The transition from raw risk to net risk as well as the performance of some control elements in containing the risk and reducing its criticality is shown more clearly by the risk radar in appendix 4

The Net risk matrix permitted as to determine the prior risk zones, starting by those that needs to be treated in the first place and so along

SECTION III: ACTION PLAN

Based on the risk-understanding step and the different recommendations that were discussed during interviews; we were able to suggest actions that we judge appropriate in mitigating risks. It must be indicated that these risk actions are divided into three types:

- Corrective action: aims to eliminate the cause of a detected risk or other undesirable situation;
- Curative action: aims to eliminate the effect of a detected risk
- Preventive action: aims to eliminate the cause of a potential risks or other potentially undesirable situations

The effectiveness of the suggested actions plan can be determined based on a careful monitoring of the evolution and the changes in Key risk indicators and Key performance indicators rates as explained in the Appendixes.

Considering the lack of some information elements concerning the imperfect hedging risks we were not able to assess the risk properly all though, we suggest that it would be more suitable if the company proceeds in the representation of its liabilities based on the ring-fencing of the assets and that is by insurance business line

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

Risk code	Risk	Net	Action Plan	Time schedule
R20102	Administrated rating of the civil liability coverages		<ul style="list-style-type: none"> * Run a deep analysis of the civil liability coverage (by pricing parameter: area, age, power and usage). * Need to update the current tariff by taking into account the endogenous (S / P, turnover growth, etc.), and exogenous (market, competition, etc.) Factors it is a project to be defended at UAR and ministry level ; 	24 months
R20303	Risk of cumulative claims		<ul style="list-style-type: none"> *Think about getting reinsurance coverage for some underwritten risks * Raise clients awareness and encourage them to keep means of prevention 	6 Months
R40102	Competition risks: no recovery of Civil liability compensations		<ul style="list-style-type: none"> *Develop the platform that is created to manage SAA agencies recoveries so that it would be expensed to involve as much as possible of the other companies in the Algerian market. *Study the possibility of gathering different representatives of the insurance companies that are operating in the Algerian market in one center specialized in inter-company Civil liability claims treatment *List the motives that are the reason of this rejection and establish a database of the 	12 Months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

			recorded rejections by company and incident to insure a better management.	
R301212	Non-application of penalty		<ul style="list-style-type: none"> * Creation of a common database specific to SAA which allows the monitoring of each client's history in terms of claims and integrate it into ORASS with a regular update of the clients history * Implementation of a bonus / penalty system between all the companies under the ministry's supervision... *Encourage adverse companies to join MIRILCO services 	
R302021	Non-execution of recovery		<ul style="list-style-type: none"> * accelerate the implementation of the platform dedicated to processing recoveries * Set up deadlines for executing recoveries in order to protect the interests of the Company * Establishment of sectoral agreements which determines the terms of recoveries processing with late payment penalties *Introduce Alerts on system to remember agents about the execution of recovery *List the motives for not executing recoveries and disseminate notes concerning this problem 	12 Months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

R307011	Underinsurance (of capital to be insured : value of the vehicle) willingly		<ul style="list-style-type: none"> * Carry out statistical studies concerning the phenomenon of Motor fraud * On the basis of the these studies, put in place fraud indicators (indices) by involving Motor managers in agencies and RO * Establish a database of Black-listed policyholders and distribute it to the network * Establishment of key indicators and strategies that can be adopted in order to better detect cases of multiple fraud (from simple cases to more complex and more organized). 	12 Months
R301211	Failure to comply with pricing parameters (fiscal power)		*The establishment of a database of car registration documents that includes fiscal power for each vehicle in the market with the collaboration of customs services and a set of dealers and loss adjustors and integrate it into ORASS	24 Months
R20206	Risks of cancellation, termination, reduction		<ul style="list-style-type: none"> * Customer loyalty through a more aggressive offer (pricing) on large contracts (good risks to identify); * Prioritize the individual market through targeted offers (packaging) *Play on the rapidity of settlements in the best deadlines and the exactitude of compensations 	6 Months
R30606	Theft and fraud - Theft		* Set up messaging system so that messages are send automatically to clients	12 Months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

	/ embezzlement		<p>phones confirming the payment as well as the amount paid</p> <ul style="list-style-type: none"> * Place cameras in agencies to have proof in case of breach * Give remote access possibility to the head of agency * Change the settings on ORASS so that policies could no longer be converted into PDF format 	
R30214	refusal of the amicable transaction by the insured or the beneficiaries		<ul style="list-style-type: none"> *List the reasons for the refusals in order to remedy them during the next amicable negotiations. 	3 months
R40101	Risks resulting from market pressure to apply low tariff rates		<ul style="list-style-type: none"> * Set up a comparative statistical analysis between the direct and indirect network in terms of: premium rate, coverages , S / P, insured capital, etc. * strengthen and promote the direct network in order to limit the importance of intermediaries in the turnover achieved. * Schedule periodic visits or working meetings with important clients * Grant benefits such as: advance claims, payment schedule as long as the client is solvent, speed up compensation periods, etc. 	8 months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

			<ul style="list-style-type: none"> *Strengthening the workforce by assigning a "statistical analyst" to: * The implementation of dashboards and studies dedicated to the Motor business line * Ensure a permanent competitive watch and propose to the hierarchy any modification or adaptation relating there to. * Customer loyalty through a more aggressive offer (pricing) on large contracts (good risks to identify); * Prioritize the individual market through targeted offers (packaging). 	
R301214	Non update of capital		<ul style="list-style-type: none"> * Insert in ORASS or separate file the market prices of the vehicles and update them periodically (sort of an Argus) with a locking parameter of the insured capital box (set minimum) * Make the insured aware of the exact insurance during renewals (declaration of the real price of the vehicle) *Integrate alert on system in case (confirm value) 	12 months
R40601	Risks associated with the appearance of new		<ul style="list-style-type: none"> * Request for definition of common application texts by the Ministry of Finance for all the insurance companies in the market. 	6 months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

	laws or regulations, and their application (Vehicle and rolling engines tax 2020)		*Insure a daily monitoring of the possible changes in laws and regulations. Try to win the public opinion in case of a regulation that does not serve the company's interests and the client's ones	
R30506	Pandemic		* Encourage renewal before the deadline by phone. * Work on the digitalization and the implementation of an application to encourage online subscription *offer price advantages for customers who have not renewed their insurance during this period *Encourage electronic payments by offering discounts	12 Months
R40702	Risks of civil war, riots, foreign war, terrorist attacks and terrorism		*Insure that the commercialized coverage is dispersed enough (in terms of geography) in order to avoid risk of massive losses due to concentration problem.	3 months
R30232	ignorance of notes and circulars		*Establishment of a collection which brings together the notes and circular in force with insertion on ORASS and regular update *Develop a platform with members space with login to a library that regroups all of	12 Months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

			the notes and circulars as well as the laws and everything related to the Motor business line	
R301213	Non application of the additional premium		<ul style="list-style-type: none"> * Schedule briefings with the underwriting department to remind the company's instructions * Raise customer awareness (double penalties in the event of a claim) 	Immediate
R103011	non recovery of premiums		<ul style="list-style-type: none"> * Plan a solvency study of the client before granting him the payment schedule and verify his history in the case of a former one * SAA must surround itself with the necessary guarantees in case of a new business: certified checks, mortgage, initial contribution to be agreed of with the client that must be superior to the tax and civil liability cost , everything depends on the position of the company in the market * The payment schedule must be granted on a case-by-case basis and not systematically (especially companies incorporated under foreign law which represent a very significant risk) and depending on the amount of the premium 	Immediate

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

			<ul style="list-style-type: none"> * Implementation of detailed statistical studies of receivables relating to the auto (by agency, RO, head office and by coverages) * Implementation of an anticipatory collection strategy by reminding the customer of the payment date a week in advance to see his availability and grant him an extension favor with reasonable deadlines if necessary. * Negotiation of dissuasive commercial clauses accompanied by early management of disputes (Reinforcement of procedures relating to debt collection), * insert a late payment penalty clause * Designate a member responsible of receivables monitoring and recovery in each agency 	
R103012	Claims settlement for the benefit of customers with unpaid premiums		* Introduction of an alert system on ORASS to display the customers benefiting from a payment schedule; and lock access to their claims management.	6 Months
R20403	Risks relating to the amounts of provisions for claims: Non		* Constantly improve the information system by ensuring a rapid and consolidated feedback of statistical data in the (Preparation of a framework for claims to be paid provisions such as late declarations and upward or downward adjustments).	Immediate

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

	estimation of IBNR		* Deploy existing actuaries in SAA , to assist both claim management departments in the actuarial calculation of technical provisions	
R20302	Peak loss frequency risks		<ul style="list-style-type: none"> * Optimal use of S / P states by agreement (client) / agency / coverage / RO in order to offer better risk monitoring at different levels * establishment of a black list of clients * segmentation of the auto portfolio * Set up deductibles according to frequency and category of the risk * Program awareness days for clients and meetings with road associations * Reflect on the terms of application of the penalty for these cases (facultative coverages) 	6 Months
R301215	wrongly given discounts		<ul style="list-style-type: none"> * Insert and update of all the agreements on ORASS * Change the ORASS setting to block bonuses in new business and provide a discount limit according to the granted power of each level 	3 Months
R301216	Non application of bonus		* Run studies by the underwriting department to determine the impact of the application of bonuses on the turnover of the business line (losses in terms of premiums and gains in terms of customer loyalty in the portfolio and to win new	6 Months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

			customers);	
R302022	Non disburse of received Recovery		* Plan the best time limits to disburse the recovery to the benefit of the clients in order to protect the interests of the company with a daily verification	Immediate
R302023	No proposal amicable transaction		* Check and list the reasons for not proposing the amicable transaction by the agents in order to remedy them. * Require the amicable proposal systematically.	3 months
R302111	Slowness of processing		* Set up deadlines for each task related to claims management for example: preparation of checks: half a day, contact the client no more than one hour after the check is ready with hierarchical controls, work on getting the missing elements in the convenient deadlines * Automation of the follow-up of the progress of claims on ORASS with hierarchical controls.	3 months
R302132	indemnity calculation error		* Calculate the rate of cases taken back / filed * Identify the agencies with the highest rates. Study the main reasons for filling and take backs * The cases will be taken over in accordance with the existing reasons in a list	3 months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

			<p>established in advance and regularly updated and will be systematically subject to hierarchical control;</p> <ul style="list-style-type: none"> * Set a maximum rate of taken back / filed cases * Warn and sanction where necessary. 	
R30225	Favoring of the weak party of the policy by the judges		<ul style="list-style-type: none"> * Ensure the proper management of the claims * In the event of customer dissatisfaction (insufficient amount of compensation, etc.), prioritize the amicable solution in order to build customer loyalty in the portfolio. * If necessary, technically assist the lawyers with all the arguments likely to influence the case; * Set up an internal database to classify lawyers according to the level of expertise and the success rate * Provide specialized internal training in insurance for the benefit of our best lawyers 	12 months
R302271	granted refunds without the prior		* Change the setting on ORASS allowing access to refunds only after RO agreement	6 months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

	consent of the RO			
R302272	Non respect of settlement powers		<ul style="list-style-type: none"> * Insert firewalls in ORASS to prevent this kind of practice. * Notify managers, in case of abuse; * Configure the compensation powers by product and integrate it into the product guide (to be inserted in ORASS); * Strengthen hierarchical control *Accelerate the claims platform establishment 	6 months
R302221	Unintentional loss adjustor error over / underestimation of damage		<ul style="list-style-type: none"> * Evaluate and rank loss adjustors by prioritizing access to the best for future appraisals (database). *Expense the project of loss reparation in nature to all possible losses and with all service providers with the accompaniment of our loss adjustors to determine the exact cost of the reparation (avoid over evaluation) 	12 months
R302223	Slowness of the appraisal		<ul style="list-style-type: none"> * Set up deadlines for the appraisal in line with the extent of the damage * Reinforce the shift loss adjustor to reduce this slowness * Establishment of a database relating to the business line lost adjustors based on 	12 months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

			<p>the appraisal deadlines. A preselection of loss adjustors will be carried out according to this database</p> <ul style="list-style-type: none"> * Involve the head of agency in the control missions scheduled by the SAE to resolve this problem * Careful monitoring and analysis of the remote appraisal results to improve any insufficiencies 	
R30209	Missing claims files		<ul style="list-style-type: none"> * Scan the claims files to keep a digital copy in order to ensure easier access and transmission to the RO * Recruitment of archivists specializing in the matter or designation of a member in charge of this operation (separation of tasks) *Trimestral counting of files 	Immediate
R30233	Risks relating to the VAT system and its invoicing		<ul style="list-style-type: none"> * Require the exemption certificate at each renewal and integration of a list of exempted activities or customers on ORASS * Strengthen the control of such cases 	Immediate
R30305	Computer failures		<ul style="list-style-type: none"> * Provide for the implementation in ORASS or via Outlook or website of intervention request models in order to accelerate the management of breakdowns 	* 6 months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

			<ul style="list-style-type: none"> * Implementation of a system for monitoring the life cycle of IT equipment with a renewal plan defined in advance taking into account the budgetary constraints of the Company and the latter's needs in the IT field. * Ensure the implementation of restoration or data recovery tools; * Establishment of sharing folders 	
R304151	Break in knowledge transfer		<ul style="list-style-type: none"> * Establish and ensure a policy for the management of knowledge / skills transfer between employees or via hierarchy; * Manage FAQ. * Update manuals of procedures regularly and insert them in ORASS or in a virtual library 	3 months
R304152	Work overload		<ul style="list-style-type: none"> * Set up a statistical analysis concerning the work volume of the business line's agents * In case of overload compared to other business lines, plan to apply the mobility and / or versatility system. * Study the possibility to apply shift teams 	3 months

CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA

R30603	settlement of uncovered and fraudulent claims willingly		<ul style="list-style-type: none"> *Raise the awareness of the staff *Apply sanctions in case of a breach 	Immediate
R307012	Loss prior to the inception date of the policy		<ul style="list-style-type: none"> * Carry out statistical studies concerning the phenomenon of Motor fraud * On the basis of the these studies, put in place fraud indicators (indices) by involving Motor managers in agencies and RO 	8 Months
R307013	Declaration of false circumstances of the accident		<ul style="list-style-type: none"> * Establish a database of Black-listed policyholders and distribute it to the network * Establishment of key indicators and strategies that can be adopted in order to better detect cases of multiple fraud (from simple cases to more complex and more organized). 	
R30704	Other external frauds: Fraudulent appraisal		<ul style="list-style-type: none"> * Establishment of a file retracing the loss adjustors errors with the related adjustor in order to blacklist them (see possible sanctions); * Reinforce this database with ALFA files. 	12 Months

CONCLUSION

This last chapter was reserved for setting up a risk mapping for the Motor insurance business line within the company SAA

The steps were divided into three main sections: we started by defining the key processes that are the subject of our study and identified the inherent gross risks as well as the control elements associated with them in a first section. The risk identification was done according to the nomenclature and the logic of the IFACI that was largely inspired by the ISO 31000 standard.

Following this, we evaluated these risks and the measures for their control, to reduce the net risks in a second section. Results of all that we have just said were presented and commented on.

In the third section, we made a graphical representation of the gross risk, control elements and net risks. This has allowed us to locate the risk zone whose treatment must be prioritized (priority action zone) and this, through the implementation of an action plan, where for each risk we proposed actions judged necessary for its mitigation.

GENERAL CONCLUSION

GENERAL CONCLUSION

Risk management is a relatively new discipline, at least for Algerian companies who are managing their risk consciously or unconsciously but rarely systematically. But it has been developing into full holistic systems and starting to be taken more and more into consideration in the last few years by several actors in the market.

Risk mapping has proved to be an efficient tool for carrying out a risk inventory and assessment within insurance companies. Certain references have actually encouraged its implementation and that is in an attempt to reduce the computational obsession and adopt a qualitative approach as was recommended by the Solvency II directive, which dedicated a completely qualitative pillar to encourage a better risk management processes.

Our work aims to set up a risk mapping of the Motor insurance business line within the company SAA.

To do this, we have adopted a two parts structure: theoretical and practical. In the first chapter, we highlighted the key concepts of Enterprise Risk Management (ERM) and reviewed the reference standards, in particular ISO31000, COSO II and FERMA, as well as the requirements of the Solvency II directive in risk management. We dedicated the second chapter to present risk mapping and the used methodology in its development as well as the adopted approach to allow its proper establishment

The second part was reserved for the practical case study, which aims to set up a better control of the risks inherent to the activity of Motor business line and to maximize its results.

We started designing the risk mapping within the Motor division by identifying the technical activity processes, namely: underwriting, claims management and recovery monitoring.

The second step consisted of identifying the risks in addition to the existing control elements using a combined approach (top-down and bottom up). We then proceeded with an assessment of these risks based on the data that we were able to collect during interviews as well as the responses to the survey that we have disseminated to the entire network.

Finally, we ranked the risks according to their level of criticality. This approach made it possible to highlight the different risk areas and to draw up the risk matrix.

The most critical risk, which we were able to identify during the study, is the pricing risks and most precisely the administrated pricing of the civil liability coverage; it constitutes a catastrophic risk considering the underpricing it imposes and the high loss ratio related to it.

Some other very strong risks were also identified such as the risk of cumulative claims that is hard to have control over it, the non-recovery of civil liability compensations that could seriously impact the company's solvency as consequence for paying but not receiving

We have identified a long list of other risks that need to be treated for better management, although it must be indicated that the company is working on several projects that are expected to eradicate plenty of risks especially those ranked as strong and moderate and mostly related to the claims management process.

By the action plan that we suggested we hope to bring value to the company by initiating the first step in its risk management system.

It must be noted that this study was limited by several constraints those of time, data collection issues, and especially the sanitary situation imposed by the COVID-19 which did not allow us to have the internship that we aspired to have

Indeed risk mapping constitutes a great tool as a first step in managing risks systematically, especially in case of a company, which is willing to create a full risk management system, it has the advantage of a low cost from a hand, but it is a long and time consuming process from another one.

Finally, we must say that risk mapping is by definition never completed. Rather, it is an iterative and living process that needs to be continuously updated and enriched.



REFERENCES

REFERENCES

Books

- Cartographie des risques (2e éd.) - Groupe Assurance (octobre 2013)
- Corporate Risk Management Ed. 2, Merna, Tony, Al-Thani, Faisal F., John Wiley & Sons, 2008
- Dictionnaire de l'assurance, Charbonnier, Jacques, AFNOR, 2019
- Enterprise Risk Management : A Common Framework for the Entire Organization, Green, Philip E. J., Elsevier Science, 2015
- Enterprise Risk Management : From Incentives to Controls Ed. 2, Lam, James, John Wiley & Sons, 2014
- ERM - Enterprise Risk Management : Issues and Cases, Louisot, Jean-Paul, Ketcham, Christopher, John Wiley & Sons, 2014
- Executive's Guide to Solvency II, Buckham, David, Wahl, Jason, Rose, Stuart, John Wiley & Sons, 2010
- Fundamentals of Enterprise Risk Management : How Top Companies Assess Risk, Manage Exposure, and Seize Opportunity Ed. 2, Hampton, John J., Amacom, 2014
- Lexique du Risk management : Vocabulaire des termes essentiels : Risques, sécurité et assurance - Français-anglais et anglais-français, Charbonnier, Jacques, AFNOR, 2019
- Management du risque : une approche stratégique : Cartographie des risques : prenez de la hauteur !, Sutra, Géraldine, AFNOR, 2018
- Managing Risk and Performance : A Guide for Government Decision Makers, Stanton, Thomas, Webster, Douglas W., John Wiley & Sons, 2014
- Risk Management and Financial Institutions Ed. 5, Hull, John C., John Wiley & Sons, 2018
- Risk Management Ed. 2, Pierandrei, Laurent, Dunod, 2019
- Risk Management et stratégie selon la norme ISO 31000 : Les bénéfices de l'intégration de l'ERM dans les processus stratégiques, Louisot, Jean-Paul, AFNOR, 2016
- Solvency 2 - Impacts stratégiques et de marché, Morlaye, Frédéric, RB édition, 2017

Thesis

- ALJA FERKOLJ, Enterprise Risk Management Analysis With Suggestions For Improvements For The Selected Company Ljubljana, November 2010
- AYARI HAJER, Cartographie des risques de la branche d'assurance Engineering au sein de la compagnie GAT Assurances, IFID, 2018
- BEN AMARA Radhouane, La conformité et la gestion prudentielle dans une compagnie d'assurance : Démarche d'implémentation dans le contexte tunisien, Université Virtuelle de Tunis, 2017
- Enterprise Risk Management and Firm Performance: Developing Risk Management Measurement in Accounting Practice Juthamon Sithipolvanichgul Doctor of Philosophy The University of Edinburgh 2016
- GUETTECHE Hamza, Risk Management En Assurance : cartographie des risques Appliquée sur la branche transport maritime sur corps de navires de la CAAT, 34ème promotion IFID.
- ZEMMOURI SAFA, La gestion des risques en assurance : L'élaboration d'une cartographie des risques appliquée sur « les grands risques d'exploitation » de la CASH ASSURANCES, IFID,2018

Articles and reviews

- Best practices for the risk mapping process, by david ingram, fsa, frm, prm and paul headey, fia,
- COSO-ERM-Executive-Summary
- Eciia/ferma guidance on the 8th eu company law directive
- Enterprise Risk Management Integrated Framework Executive Summary September 2004
- Iia position paper: the three lines of defense in effective risk management and control january 2013
- international standard iso 31000 second edition 2018-02
- Operational Risk Management in insurance through the process of Self Risk Assessment : Methodology of application, El Arif Fatima Zahra1 , Hinti S, 2013

APPENDIXES

1. Citez le problème? *

Votre réponse

2. Quelle est selon vous la cause(s) probable de ce problème?

- Méthode (de travail)
- Facteur humain (personnel)
- Les garanties offertes ou souscrites
- Moyens nécessaires
- Environnement (facteurs externes)

3. Précisez la cause (s) choisie dans la question N°2?

Votre réponse

4. Sur une échelle à cinq niveaux, comment évaluez-vous la fréquence de ce problème ? *

Sélectionner



5. Sur une échelle à cinq niveaux, comment évaluez-vous la gravité de ce problème ? NB: CA= chiffre d'affaire BN= bénéfice *

Sélectionner ▼

6. Existent-t-ils des moyens de contrôle pour ce problème ? Exemple: Note, circulaire, contrôle interne...etc *

Sélectionner ▼

7. Si oui, lesquels?

Votre réponse _____

8. Sur une échelle à cinq niveaux, comment évaluez-vous la pertinence des moyens de maîtrise identifiés dans la question N°7?(la capacité à réellement réduire le risque)

Sélectionner ▼

9. Sur une échelle à cinq niveaux, comment évaluez-vous l'efficacité des moyens de maîtrise identifiés dans question N° 7?

Sélectionner ▼

10. Que proposez-vous pour remédier à ce problème?

Votre réponse

[Retour](#) [Suivant](#)

N'envoyez jamais de mots de passe via Google Forms.

Ce contenu n'est ni rédigé, ni cautionné par Google. [Signaler un cas d'utilisation abusive](#) - [Conditions d'utilisation](#) - [Règles de confidentialité](#)

Google Forms

Process mapping

Key Process	Sub-Process	Activity	Objectives
Management of Motor insurance production		Establishment and monitoring of notes and instructions	<ul style="list-style-type: none"> *The establishment and dissemination of notes and circulars of the supervisory authority and/or the central division concerning production management * Ensure the respect of these documents as well as the production procedures
	Production management and monitoring	Management and control of subscriptions, setting up agreements and processing of specifications and quotation proposals	<ul style="list-style-type: none"> * Participate, alongside other technical divisions, in setting up insurance programs and negotiating insurance agreements for large customers * canvass and manage major business underwritings in fleets. * Develop the contractual documents required for drafting and pricing; * Risk selection and implementation of prevention policies in order to mitigate claims * Respond to quotation requests * Assist and supervise the distribution network in terms of policies underwritings and pricing
	Management and Monitoring of Service Providers		<ul style="list-style-type: none"> * Development of agreements with all service providers * Study of service proposals and formulation of opinions on the possibility of representation * Implementation of a competitive policy based on the application of preferential pricing by service providers to the SAA;

			* Monitor the activity of service providers in order to guarantee a better quality of service for policyholders
	Establishment and update of the business line's activity statistics		* Consolidation and exploitation of Motor production and Motor Claims reports * Establishment of production, claims and receivables statistics * Analysis of results * Reporting * Monitoring of assigned objectives

Key Process	Sub-Process	Activity	Objectives
Management of Material / Bodily injury Compensation	Management of bodily injury and material claims files	Establishment and monitoring of notes and instructions	*The establishment and diffusion of notes and circulars of the supervisory authority and/or the central division concerning claims management
		Processing, monitoring and control of material / bodily claims	proceed with a technical control of the managed claims by RO and agencies in case of beyond settlement authority power * Ensure the regularity of declared claims * promote amicable settlement with victims of material and bodily injuries claims or their right holders * Dissemination of inter-company agreements in terms of claims management, appraisal, direct compensation of policyholders to the network *Study of claims relating to a loss, from

			a policyholder or a third party
	Provisions management and monitoring		* Set the amounts of provisions *Establish activity reports and technical balance sheets

Key Process	Sub-Process	Activity	Objectives
Recovery right and running off operations	Recovery right monitoring	Establishment of notes, Circulars, directives and assistance to Network	* Establishment and dissemination of notes and circulars in addition to those of the supervisory authority and the DG, UAR, DSG for recoveries management * Monitoring of the application of these Notes and Circulars * dissemination and monitoring of the application of outstanding agreements (IRSAM / IDA)
		Management of recovery files and data consolidation	* Analyze and monitor the monthly recovery statements and preparation of reports * Proceed in a technical control of total of recoveries managed by the ROs and agencies and exercise permanent monitoring of recoveries and their collection both at the level of the agencies * Exercise recovery right to retrieve any sums wrongly paid in the event of fraud * Keep recovery statistics by sub- business lines and by customers and carry out their exploitation in order to feed the structure in charge of global statistics of the Motor business line
	Exceptional running off	Exceptional running off	* Organize and control running off operations with opposing insurance

	operations management	operations management considering the length of the processing and implication settlement between companies	companies *Establishment of an agreement protocol between the companies which have decided to carry out these exceptional operations *Running off the Stock of Suspended files as much as possible, * Ensure the effective completion of running off operations * Data Collection, Analysis, Processing & Consolidation; * Establishment of Monitoring and Progress Reports, *Network monitoring and assistance
All processes	All processes	Network animation and training	* Participate, alongside the training structure, in all seminars for the benefit of the network and customers

Family	Risk level 2	level 3	Risk level3	Analysis				
				Identified risk	Cause	Consequence	Process	Axe value
R1 Financial	R102 ALM adequacy							
		R10201	Liquidity risks	Corresponds to a change in short-term liabilities causing achievable asset shortfalls	Claims load evolution more than usual	Sell the company's assets before their term recording losses in their value	Claims management	Liquidity, result
	R10204	Imperfect hedging risks	inadequate or insufficient structure of assets compared to that of liabilities	Placements based on the general treasury of the company and not on each business line	Sell the company's assets before their term recording losses in their value	Claims management	Solvency, liquidity	
	R102 Assets management	R10301	Treasury risks	Resulting from a lack of available liquidity in the short term to meet settlement obligations				
				non recovery of premiums R103011	* client insolvency * negligence and lack of monitoring by managers	financial difficulties and a major financial impact on the company's balance	Underwriting	Liquidity, solvency
				Claims settlement for the benefit of customers with unpaid premiums R103012	* negligence and lack of monitoring by managers * Commercial gesture in case of an agreement with public companies after the agreement of the RO		Underwriting	Liquidity, solvency

R2 Insurance	R201 Technical	R20102	Pricing risks (Underwriting insurance or reinsurance)	Risks arising from rates that are either insufficient in relation to the real cost of coverage and management fees, or too high and generating adverse selection : administrated rating of the civil liability coverage	Algerian regulations: pricing subject to the prior agreement of the ministry of finance	Unprofitability of the civil liability coverages	Underwriting	Result, solvency
	R202 Underwriting	R20206	Risks of cancellation, termination, reduction	High frequency of contract drops or reductions (premiums payment stop)	Unsatisfied client	Decrease in turnover and loss of market share	Underwriting	Result
	Non-life claims / Life benefits R203	R20302	Peak loss frequency risks	Occurrence of large claims more frequently than expected	Lack of risk monitoring	Claim load increase	Claims management	Result, liquidity
		R20303	Risk of cumulative claims	Occurrence of a catastrophic loss, a liability or serial accumulation, or an accumulation of claims between several business lines	Lack of risk monitoring	Claim load increase a structural deficit and bleeding	Claims management	Result, solvency, liquidity

R3 Operational	Provisioning R204	R20403	Risks relating to the amounts of provisions for claims	Risks resulting from insufficient provisions for claims or in excess of the incurred claims expense or load :Absence of IBNR estimation	*Lack of knowledge of methods *Lack of statistical data *Lack of Actuarial structure *Absence of clarification by the Algerian legislation	Insufficient provisioning	Claims management	Result, solvency,
	R301 Clients, product and business practices	R30121	Defects in Products - Pricing Policy: Non-compliance with the pricing policy	Failure to comply with pricing parameters (fiscal power) R301211	Human error	Underpricing Insufficient insurance premium that does not cover the real price of the risk (bad pricing)	underwriting	Result
				Non-application of Penalty R301212	Absence of the clients history even in the same company but between different agencies, or in case of a new policy holder		underwriting	Result, solvency
				Non application of additionnel premium R301213	Absence of precise information elements concerning risk aggravation Usage by another driver (age and driving license)			
				Non update of capital R301214	*Lack of insureds declarations *Agent's lack of training			

			wrongly given discounts R301215	* Bonuses granted to policies taken out in "new business" * Tariff reductions of up to 90%, granted without justification *Confusion in the application of agreements discount rate				
			Non application of bonus R301216	Absence of the clients history even in the same company but between different agencies, or in case of a new business	Overpricing Loss of customers in profit of the competition following the high tariff	underwriting	Result, image and reputation	
	R30202	Entry, execution and monitoring of transactions - Compliance with procedures	Failure to respect or misinterpret procedures Non-execution of recovery in case of settled claims. R302021	* Lack of reciprocity (responses) by the opposing companies and in particular the GA * Geographical remoteness	Excessive volume of overdue files which generates a liquidity problem due to paying and not recovering	Recovery monitoring	Result, solvency, liquidity	
			Non disburse of received Recovery R302022	Negligence	Delay in claims payment	Recovery monitoring	Image, reputation	
			no proposal of amicable transaction by the manager of the bodily injury claims R302023	* Liability is not yet determined *intoxication *negligence	* Additional costs to be paid: appraisal and bailiff fees.... * excessive volume of files to be processed	Recovery monitoring	Result	
	R30201	Entering, executing and	Failure to meet deadlines and / or obligations to customers and / or suppliers: delay in compensation's payment					

		monitoring transactions - Deadlines and obligations towards clients	Slowness of processing R302111	Lack of information elements as authorities minutes report PV in bodily injury claims *Failure to meet appraisal deadlines	* excessive claim volume to be treat *dissatisfaction of clients	Claims management	Image, reputation
			Slowness of technical and financial settlement R302112	*Claims that exceeds agency power *Load at regional offices level *geographic distance of the agency from the DR *absence of the consignee (accountant) even if its not exceeding the power		Claims management	
	R30213	Entry, execution and monitoring of transactions - Complaints handling Failure to process complaints	indemnity calculation error R302132	*Non-application of dilapidation * Lack of driver's information RC *Driver responsibility determination problem *Typing error (days of immobilization)	* Wrong amount of compensation (higher than should be) paid to the customer causing à financial imbalance * Unsatisfied client and risk of termination in case of the underestimation of the compensation	Claims management	Result, solvency image et reputation
R30214	Entry, execution and monitoring of transactions - Others	Other causes related to treatments and procedures (to be specified) refusal of the amicable transaction by the insured or the beneficiaries	* Victim is not satisfied with the appraisal * geographic distance	* Additional costs to be paid: appraisal and bailiff fees....	Recovery management	Result, image	

	R30225	Legal risks	Risks related to changes in the law and court decisions: favoring of the weak party of the policy by the judges	* Lack of knowledge of the insurance system by judges * insufficient defense * No designation of a lawyer to defend the interests of the company	abusive judgment	Recovery management	Result, image and reputation		
		R30227	Risks of non-compliance with commercial delegation limits	abuse or non-compliance with the power of delegation by a trade commissioner or agent					
				Refunds are granted without the prior consent of the RO and sometimes even for policies affected by partial or total claims settlements (AGA) R302271	Lack of motive request, deed of sale, refund rider or endorsement	Decrease in the result	Claims management	Result	
	Non respect of settlement powers R302272			Absence of signature control by banks					
	R30222	Suppliers - Poor execution of services	Poor execution of services, including external management delegates						
			Unintentional loss adjustor error over / underestimation of damage R302221	*Lack of qualification *Lack of training *Lack of specialization *Lack of spare parts pricing	Impact on the accuracy of the amount determined by the appraisal	Claims management	Result, image and reputation		
			Lack of information elements R302222	*Lack of observations on loss adjustor report *No specification of immobilization days	Impact on the accuracy of the amount determined by the appraisal	Claims management	Result		

				number *Problems related to the reform of the vehicle (technical and economic)	Increase or decrease in claims load		
			Slowness of the appraisal R302223	*Lack of the spare parts pricing by SAE *Geographic distance *Considerable delays in the appraisal date considering the date of mission order (sickness, holiday)	* delay in compensation settlement and possibility of termination in case of customer dissatisfaction	Claims management	image and reputation
	R30209	Entering, executing and monitoring transactions - Audit trail Lack of proof (archiving, traceability) / audit trail (SOX)	Missing claims files that remain unjustified, by the agency or the relevant departments of the related RO	* negligence, delivery to RO without slips * transfer to the opposing company	Lack of proof	Claims management	Conformity
	R30232	Risks relating to the dissemination of information and data internally	Risk of deficiencies or clumsiness in the dissemination of messages and data internally ignorance of notes and circulars	* Important and regular issue of notes and circulars	* Confusion in the choice and application of the note in force	all	all
	R30233	Risks relating to the VAT system and invoicing	Exemption from VAT wrongly for activities which do not give right to exemption , or application of VAT for exempt cases	*Failure to understand certain clauses of the agreements * negligence of agents *Absence of the exemption certificate	Sanctions by the authorities	underwriting	Result Conformity, image and reputation

Business and systems malfunctions R303	R30305	Systems - Availability of systems computer failures	System failure, insufficiency, temporary unavailability of IT resources	* Hardware failure * Software failure	* activity postpone until the problem is resolved *Acquisition of new material	all	Result	
	R30415	Human Resources Management – Other	Other problems related to human resources management: break in knowledge transfer R304151	* lack of training * incompetence of the hierarchical manager	* poor mastery of the activity	all	Result	
			work overload R304152	* lack of staff * working hours *Ambitious objectives	*Lack of concentration *Errors	all	Result	
R305 External events that cause damage to physical assets	R30506	Disasters and other claims- Pandemic Pandemic	Pandemic	non-renewal of contracts because of the quarantine and the fall of customer’s purchasing power during this period	Drop in turnover	Underwriting	Result, liquidity	
R306 Intentional misconduct (internal fraud)	R30603	Unauthorized activity - Abuse of authority	Abuse of power, unauthorized intentional activity: settlement of uncovered and fraudulent claims willingly	complicity with the insured	Increase in claims overload which impacts negatively the results of the company	Claims management	Result, liquidity, solvency,	

R307 Unauthorized activities by external parties (external fraud)	R30606	Theft and fraud - Theft / embezzlement		*Subscription of policies in "WORD" and "PDF", which are neither registered in ORASS nor declared to the company	*Lack of triangular control in some agencies *Factors related to the person committing this acts	Underwriting	Result, liquidity, solvency, image and reputation
	R30701	Theft and fraud - False declarations	Underinsurance (of capital to be insured : value of the vehicle) R307011	New policies subscription without issuing a risk inspection (visit) certificate and without taking pictures	*Underpricing * Increase of claims load and payment of an overestimated compensation or indemnity	Underwriting	
			* Loss prior to the inception date of the policy R307012			Claims management	
			* False circumstances of the accident R307013			inaccurate or missing information	Claims management
R30704	Theft and Fraud - Other	Other external frauds: Fraudulent appraisal	complicity with the insured				Result, image, reputation

R4 Strategic and environmental	R401 Insurance Market	R40101	Risks relating to tariff cycles	Risks resulting from market pressure to apply low tariff rates	* Tariff war * Effect of intermediation	Bad pricing and inadequate premium: Underpricing	Underwriting	Result, image, reputation, liquidity, solvency
		R40102	Other Competition risks	Risks resulting from the exercise of similar activities by other companies: rejection of the claim files by the opposing party	Confirmation of the mismatch of the impact points, following the examination of the statements provided by the two or several antagonists	* Loss of recovery right	Recovery management	Result, image, reputation, liquidity, solvency
	Marketing	R40301	Risks of poor analysis of target markets	Risks arising from poor identification of needs, poor customer segmentation, etc., leading to the development of unsuitable products	Inadequate coverage: Lack of adequate insurance	Loss of Market share	Underwriting	Result
	Legislative, regulatory and judicial	R40601	Risks associated with the appearance of new laws or regulations, and their application	Vehicle and rolling engines pollution tax	* Lack of unified application text for all companies	*Drop in turnover *Loss of Market share	Underwriting	Result

	Other systemic and exogenous risks	R40702	Political risks	Risks of civil war, riots, foreign war, terrorist attacks and terrorism			Claims management	Result, solvency
--	------------------------------------	--------	-----------------	---	--	--	-------------------	------------------

Family	Risk level 2	level 3	Risk level3	Definition	Risk management system	KRI
R1 financial	R102 ALM adequacy	R10201	Liquidity risks	Corresponds to a change in short-term liabilities causing achievable asset shortfalls	None proper to motor business line	
		R10204	Imperfect hedging risks	inadequate or insufficient structure of assets compared to that of liabilities	None proper to motor business line	
	R103 Assets management	R10301	Treasury risks	Resulting from a lack of available liquidity in the short term to meet settlement obligations		
				non recovery of premiums R103011	<ul style="list-style-type: none"> *Hierarchical control *notes and circulars *posterior control *procedure of monitoring and managing debts on policyholders * unpaid premiums meeting each 45 days * creation of a unit responsible for monitoring premium collection * Statement 010 and 011 	Recovery rate

				Claims settlement for the benefit of customers with unpaid premiums R103012	*Hierarchical control *notes and circulars *posterior control * procedure of monitoring and managing debts on policyholders	Total claims settled/total unpaid premiums (number and amount)
R 2 Insurance	R201 Technical	R20102	Pricing risks (Underwriting insurance or reinsurance)	Risks arising from rates that are either insufficient in relation to the real cost of coverage and management fees, or too high and generating adverse selection : administrated rating of the civil liability coverage R20102	None	Loss ratio
	R202 Underwriting	R20206	Risks of cancellation, termination	High frequency of contract drops or reductions (premiums payment stop)	None	Renewals/total policies
	R2030 Non-life claims / Life benefits	R20302	Peak loss frequency risks	Occurrence of large claims more frequently than expected	* No renewal without the agreement of the GM * implementation of certain settlement conditions for certain risks	Loss ratio
		R20303	Risk of cumulative claims	Occurrence of a catastrophic loss, a liability or serial accumulation, or an accumulation of claims	None	Loss ratio

				between several business lines		
	R204 Provisioning	R20403		Risks resulting from insufficient provisions for claims or in excess of the incurred claims expense or load Absence of IBNR estimation	*Estimation and injection as claims to be paid on the basis of average cost based on the balance sheet of the last 3 years * Balance sheet commissions * headquarters commissions * Half-yearly semestrial control	
R3 Operational	Clients and business practices R301	R30121	Defects in Products - Pricing Policy: Non-compliance with the pricing policy	Failure to comply with pricing parameters (fiscal power) R301211	none	Policies with fiscal power error/ total subscribed policies
				Non-application of penalty	*Systematic unless in case of a new client *MIRILCO company services to provide claims records	Policies with no penalty/total policies
				Non application of additionnel premium R301213	*notes and circulars *special conditions of the auto policy	
				Non update of capital	RPP only In case if a claim	Policies with no

			R301214		update/total policies
			wrongly given discounts R301215	*Hierarchical control *notes and circulars *posterior control *Sanctions in case of a breach *Dissemination of agreements	Policies with wrong discounts/total policies
			Non application of bonus R301216	*Systematic unless in case of a new client * claims record certificate	Total policies with no bonus/total policies
	R30202	Entry, execution and monitoring of transactions - Compliance with procedures	Failure to respect or misinterpret procedures Non-execution of recovery in case of settled claims under R302021	Digital platform that treats recoveries between SAA agencies with an ambition to generalize this process to adverse companies	Received recovery/ total settlements
			Non disburse of received Recovery R302022	*Hierarchical control *notes and circulars *posterior control	Number
			No proposal amicable transaction by the manager of the bodily injury claims R302023	*notes and circulars *posterior control	Number
	R30211	Entering, executing and monitoring transactions - Deadlines and	Failure to meet deadlines and / or obligations to customers and / or suppliers: delay in compensation's payment	*Claims platform * Algerian law	Average time to settle a claim Total

			obligations towards clients		
			Slowness of processing R302111	Digital claim management platform	Total claims exceeding average time/ total claims settled
			Slowness of technical and financial settlement	*Hierarchical control *notes and circulars *posterior control *Regulator inspector (technical agreement)	Total claims exceeding average time/ total claims settled
			indemnity calculation error R302132	*Claims manager confirmation based on observation and interview with the client before financial settlement *arbitration commission at the time of a liquidation operation to settle the dispute *Verification by the claim manager, readability, information, driver's license (inconsistency of the circumstances, rejection of the handling of the file *Creation of common platform between SAA and the appraisal company SAE which allows the systematic insertion of the loss adjustor report	Settlements with errors/ total settlements

		R30214	Entry, execution and monitoring of transactions - Others	Other causes related to treatments and procedures (to be specified) refusal of the amicable transaction by the insured or the beneficiaries	None	Evolution in number and amount Settlements refused amicably/ total claim settlements
		R30225	Legal risks	Risks related to changes in the law and court decisions: favoring of the weak party of the policy by the judges	*Designation of lawyer to avoid the risk *Hierarchical control *notes and circulars	Abusive judgement settlements / total settlements
		R30227	Risks of non-compliance with commercial delegation limits	abuse or non-compliance with the power of delegation by a trade commissioner or agent	*Hierarchical control *notes and circulars *posterior control	Number
				Refund are granted without the prior consent of the RO and sometimes even for policies affected by partial or total claims settlements (AGA) R302271	*Hierarchical control *notes and circulars *posterior control	Number and amount
				Non respect of settlement powers R302272	*Hierarchical control *notes and circulars *posterior control *Claims management platform that settles claims in a centralized way	Number and amount

	Execution, delivery and management of processes	R30222	Suppliers - Poor execution of services	Unintentional loss adjustor error over / underestimation of damage R302221	Project “loss reparation by nature” (no financial compensations)	Under or overestimated reports/ total reports
				Slowness of the appraisal R302223	* Shifts appraisals * Remote appraisals	Total Number of days took in appraisal/ total claims
		R30209	Entering, executing and monitoring transactions - Audit trail Lack of proof (archiving, traceability) / audit trail (SOX)	Missing claims files that remain unjustified, by the agency or the relevant departments of the related RO	*Hierarchical control *notes and circulars *posterior control *Settled Claims register * 3 months to find the missing files to prove the initiated payment initiated (observation on PV) * counting commissions according to the balance sheet of claims to be paid on ORRASS	Number missing files/ number files
		R30232	Risks relating to the dissemination of information and data internally	Risk of deficiencies or clumsiness in the dissemination of messages and data internally ignorance of notes and	*Dissemination via mail and outlook	mastery degree of procedures and notes

			circulars		
	R30305	Systems - Availability of systems computer failures	System failure, insufficiency, temporary unavailability of IT resources	*contact the RO to repair the damage or the IT structure	Mean Time Between Failure Mean Time to Repair
	R30233	Risks relating to the VAT system and invoicing	Exemption from VAT wrongly for activities which do not give right to exemption , or application of VAT for exempt cases	*Hierarchical control *notes and circulars *posterior control *Law of finance *TVA statement	Wrong invoice number/ total invoices
	R30415	Human Resources Management – Other	Other problems related to human resources management: break in knowledge transfer R304151	*training sessions *Career management	mastery degree of procedures and notes
			work overload R304152	*Assistance by HQ and RO in some cases especially in claims management *The Project of claims platform	

	External events that cause damage to physical assets	R30506	Pandemic		none	Turnover evolution (decrease)
	Intentional misconduct (internal fraud)	R30603	Unauthorized activity - Abuse of authority	Abuse of power, unauthorized intentional activity: settlement of uncovered and fraudulent claims willingly	<ul style="list-style-type: none"> The project of Claims platform Settlements powers 	fraudulent settlements/total settlement
		R30606	Theft and fraud - Theft / embezzlement		*Triangular control for only some agencies *Physical inventory	Fraudulent policies/ total policies
	Unauthorized activities by external parties (external fraud)	R30701	Theft and fraud - False declarations	Underinsurance (of capital to be insured : value of the vehicle)	*posterior control *RPP *RPC *ALFA services *Risk inspection and photo taking	The number of false declaration policies/ total policies
				* Loss prior to the inception date of the policy R307012	*notes and circulars *posterior control *Risk inspection *MIRILICO services *ALPHA investigation	Number of policies with prior losses/ total policies number

				* False circumstances of the accident R307013	*Verification with the opposing party declarations *ALPHA investigation	Total fraudulent declarations/ total declarations
		R30704	Theft and Fraud - Other	Other external frauds: Fraudulent appraisal	*second appraisal *verification of the adequacy between the loss and the appraisal	Fraudulent appraisals/Total appraisals
R4 Strategic and environmental	Insurance Market	R40101	Risks relating to tariff cycles	Risks resulting from market pressure to apply low tariff rates	Innovation in products Making agreements Aggressive offers....etc	Turnover evolution SAA Market share evolution compared to total Market evolution
		R40102	Other Competition risks	Risks resulting from the exercise of similar activities by other companies : non recovery of compensations paid in Civil liability	*None	non recoveries total/total settlements in CL
	Legislative, regulatory and judicial	R40601	Risks associated with the appearance of new laws or regulations, and their application	Vehicle and rolling engines pollution tax	*None	Turnover evolution

	Other systemic and exogenous risks	R40702	Political risks	Risks of civil war, riots, foreign war, terrorist attacks and terrorism	*None	Claims load evolution
--	------------------------------------	--------	-----------------	---	-------	-----------------------

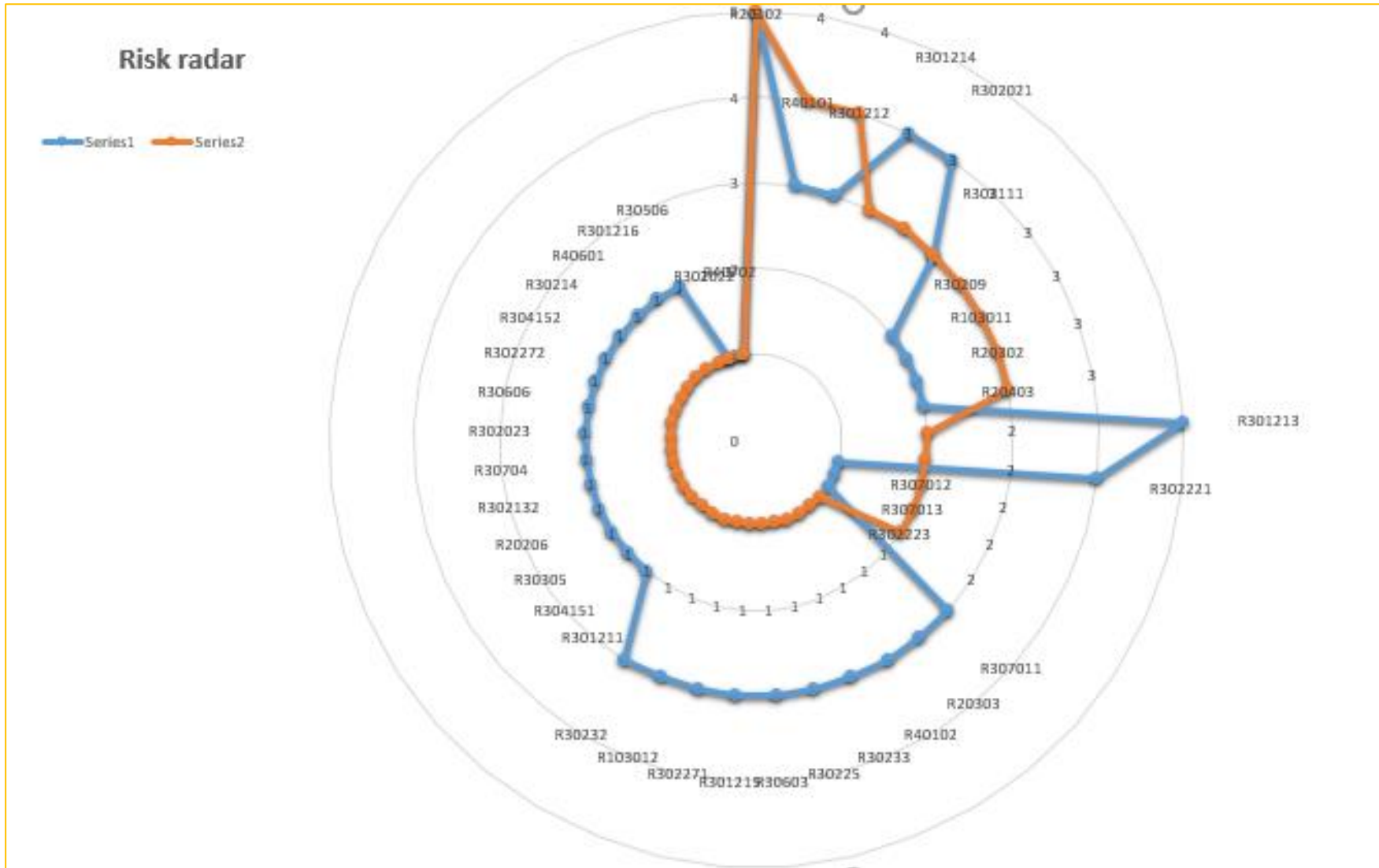


Table of Contents

DEDICATION	i
ACKNOWLEDGMENTS.....	ii
ABSTRACT	iii
LISTE OF FIGURES.....	iv
LISTE OF TABLES	v
LISTE OF ABBREVIATIONS	vii
CONTENTS	viii
GENERAL INTRODUCTION.....	1
PART ONE : THEORETICAL PART	4
CHAPTER I: RISK MANAGEMENT BACKGROUND.....	6
SECTION I: ENTREPRISE RISK MANAGEMENT FRAMEWORK	7
1. Risk concept.....	7
2. Risk and uncertainty	8
3. The evolution of Risk management	8
4. Implementing ERM	9
5. Existing ERM references	10
SECTION II: THE REGULATORY FRAMEWORK OF RISK MANAGEMENT: SOLVENCY II DIRECTIVE	13
1. Origins drivers of regulatory change	14
2. The Economic balance sheet.....	15
3. Structure of the directive.....	16
SECTION III: MAIN RISKS TO BE CONSIDERED IN ERM	20
1. FERMA classification.....	20
2. The Institute of Internal Auditors risk inventory	21
CONCLUSION	24
CHAPTER II: RISK MAPPING AS A RISK MANAGEMENT TOOL	26
SECTION I: RISK MAPPING BACKGROUND.....	27
1. What is Risk mapping?	27
2. Why risk mapping?	27
3. Mapping actors	28
4. Risk Mapping Scope: General risk mapping VS thematic risk mapping	31
SECTION II: KEYS TO SUCCESSFUL MAPPING	31
1. Strong will of managers.....	32
2. Setting objectives	32
3. Mandatory passage through process mapping	32

4. Approaches overview	33
5. Designing, implementing and monitoring action plans	36
6. Avoid pitfalls.....	36
7. Regular updating	37
SECTION III: RISK MAPPING IMPLEMENTATION METHODOLOGY	37
1. Step 1: Risk identification	38
2. Step 2: Risk understanding	39
3. Step 3: Risk Assessment	40
4. Step 4: Risk Prioritization.....	43
5. Step 5: Risk Management.....	44
6. Step 6: Risk Revisiting.....	45
CONCLUSION	46
PART TWO:.....	47
PRACTICAL CASE STUDY	47
CHAPTER III: FRAMEWORK AND METHODOLOGY OF THE STUDY	49
SECTION I: PRESENTATION OF THE STUDY FRAMEWORK	50
1. History and evolution of the company	50
2. Presentation of the Motor division.....	54
SECTION II: METHODOLOGY OF DATA COLLECTION AND CHOICE OF MAPPING	58
1. The risk mapping choice.....	58
2. The choice of mapping approach	59
SECTION III: THE ADOPTED APPROACH IN THE RISK MAPPING OF THE MOTOR INSURANCE BUSINESS LINE.....	62
1. Risk identification.....	62
2. Risk understanding.....	63
3. Risk assessment and risk management	63
4. Risk prioritizing.....	68
5. Risk management	68
6. Risk revisiting.....	69
CONCLUSION	70
CHAPTER IV: SETTING UP A RISK MAPPING OF THE MOTOR BUSINESS LINE WITHIN SAA	72
SECTION 1: RISK IDENTIFICATION.....	73
1. Identification of financial risks.....	73
2. Identification of insurance risks.....	73
3. Identification of operational risks	74

4. Identification of strategic and environmental risks	74
SECTION II: RISK EVALUATION	75
1. The Risk journal	75
2. Assessment Matrixes	79
SECTION III: ACTION PLAN	82
CONCLUSION	98
GENERAL CONCLUSION	99
REFERENCES	102
REFERENCES	103
APPENDIXES	105