RISK ANALYSIS IN TAX DEBT MANAGEMENT

IOTA
Intra-European Organisation of Tax Administrations

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RISK ANALYSIS

In Tax Debt Management

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1 Introduction

To assist member countries in determining the best use of risk analysis in the process of debt management the Area Group on Debt Management of the Intra-European Organisation of Tax Administrations (IOTA) nominated a task team whose function was to examine and report on the processes used within the membership.

It was decided that the best way of acquiring the information necessary for the report was to prepare and issue a questionnaire to all members of IOTA.

The report contains an analysis of the various approaches used by tax administrations of their risk analysis systems in the control of debt and offers advice as to how administrations can maximize their performance and efficiency in managing tax debts.

The report seeks to:

- Understand the meaning and advantages of using risk analysis in tax debt management processes;
- Assess the methods and strategies of risk analysis used in the management of tax debts and exam the scope of application of risk analysis methods in managing tax debts;
- Determine the use of risk analysis in different stages of debt management processes;
- Show some organisational solutions for using risk analysis for debt management purposes (structure, roles and responsibilities, staffing, etc.);
- Obtain an in-depth analysis of the functions used for the purpose of risk management of tax debts;
- Identify the key risk indicators, parameters and criteria which are used and from which different sources data is obtained;
- Examine the IT infrastructure needed to support the process of risk analysis in tax debt management;
- Provide some basic information regarding an advanced use of risk analysis being data mining modelling.

The report is based on data provided by IOTA member tax administrations participating in the series of surveys conducted in 2013 and in the beginning of 2014. Therefore some of the findings may not reflect the developments undertaken in various IOTA member tax administrations since the report was compiled.

During the development of the material used in this publication, input was provided by the members of Area Group on Debt Management, who supported the efforts to collect experiences of using risk analysis in tax debt management processes. We would like to thank them all, but more specifically the five Task Team members, Christophe Zutterman and Martine Smet, Belgium; Gianfranco Cerrato, Italy; Natascha Lisenka Waleson, the Netherlands and Lisa Winge, Sweden, who compiled this report.

2 Executive Summary

Since all tax administrations encounter the same challenges – increasing tax debts and decreasing members of staff – they are in need of more efficient and more effective methods to manage their tax debts. The one method this report seeks to examine and explain is the method of risk analysis.

Understanding the meaning and advantages of using risk analysis in tax debt management

Although the definitions of risk analysis differ throughout the IOTA members, the benefits and added values they replied on the questionnaire are very much alike. Especially the rational and more effective use of human and technical resources is a theme that every tax administration relates to. We attempt to show that using risk analysis in tax debt management is an efficient way to reduce the amount of debts and it helps to choose between cost-effective approaches.

Risk analysis as a part of debt management strategies

A strategy could be defined as the plan developed by an organization to take it from where it is, to where it wants to be. Strategy generally involves setting goals, determining actions to achieve the goals, and mobilizing resources to execute the actions. Tax administrations can - using risk analysis as a strategy – lower the workload by selecting the best cases to hand over to their staff for further recovery actions and decide on which cases can not worth the effort.

The use of risk analysis in different stages of debt management processes

The process of risk analysis contains five different but equally important steps:

- Risk identification (getting a clear understanding of the risks involved)
- Categorisation and analysis of risk indicators (grouping associated risks)
- Prioritisation of risk indicators (deciding on which risks are the most significant)
- Selection (select results for lists of targets for collection/recovery procedure)
- Evaluation of the whole process

We will clarify all steps in general and relate them to the area of debt management.

Organisational solutions of risk analysis for debt management

Sufficient level of staff operating within the risk analysis unit and development of their knowledge and skills are important to consider. In order to effectively and efficiently use risk analysis within tax debt management, there are a number of ways to organise your staff. We will draw up an inventory of the different ways IOTA members organised the units in charge of revenue and recovery of tax debts.

IT Systems support in risk analysis for debt management purposes

In order to use risk analysis there is a high demand for modern IT solutions to provide further support for debt management during all phases of the risk analysis process. As we

will show, the majority of IOTA members have implemented or are in the middle of developing IT solutions in their debt enforcements units.

Use of data mining

One of the more advanced methods of risk analysis is data mining. This is a complicated and technical way to uncover patterns in massive amounts of data. The method used for both historical and current data is to predict future debtors' events and behaviour. This allows tax administrations to better identify risks, profile taxpayer's behaviour, support decision making processes and ultimately reduce debt. We will try to clarify the process of data mining and the advantages of implementing it within the area of tax debt management.

Best practises

Some IOTA members are way ahead of their colleagues in other countries. In order to learn from these advanced members, we shall list some good practices provided by them. The countries that have provided examples of their Risk Analysis in Debt Management are: Sweden, Denmark, Norway and Belgium.

Final conclusions

Our final conclusion is that the use of risk analysis in the debt management process can contribute to the achievement of established objectives, the objective in this report being minimising the risk of non-payment. As you will learn, all IOTA members agree that risk analysis creates advantages and added value by supporting the organization's objectives namely:

- Improving decision-making and planning
- Contributing to a better allocation of resources
- Optimizing operational efficiency
- Protecting the organization's image, especially when it comes to a public entity.

3 Abbreviations

BiH	Republic of Srpska
ETL	Extract Transform Load
EUR	Euro
HMRC	Her Majesty's Revenue and Customs
IAID	Internal Audit and Investigations Department
IOTA	Intra-European Organisation of Tax Administrations
IBI	Integrated Business Intelligence System
MSD	System of Integrated Management of Strategic Debtors – English acronym
NACE	Nomenclature generale des Activites economiques dans les Communautes europeennes
NAO	National Audit Office
OECD	The Organization for Economic Cooperation and Development
SAO	State Audit Office
SAS	Statistical Analysis System
SEA	Swedish Enforcement Authority
SRS	State Revenue Service
VAT	Value Added Tax

4 Understanding the meaning and advantages of using risk analysis in tax debt management

4.1 Introduction

All IOTA members have to deal with a large number of risks in tax debt management, for example the risk of non-compliance, tax fraud or insolvency by the taxpayer. This report focuses on the risk of non-payment.

Tax administrations aim to optimize collections and increase the level of voluntary compliance, but the means used to achieve that goal could be different depending on the level of risk and the nature of the taxpayer. The risk of non-payment of taxes is a very important risk to manage and its mitigation is an objective for all tax administrations because tax administrations are generally required to minimize the revenue losses by collecting taxes payable in accordance with the law, in such manner that will sustain confidence in the tax system. If taxes just get determined and not paid, the prosperity, development and the growth of a nation is threatened. There is a direct relationship between objectives which an organization strives to achieve and the risk management process, which represents how it is achieved.[1]

4.2 Definition of risk analysis in debt management

Risk analysis is a technique that is used to identify and assess factors that may jeopardize the success of a project or achieving a goal (in this case the payment of taxes). This technique also helps to define preventive measures to reduce the probability of these factors (non-payment) from occurring and identify countermeasures to successfully deal with these constraints. Risk management is the identification, assessment, and prioritization of risks. Risk analysis can be performed as part of the risk management process.

The taxpayer's behaviour can be analysed in a holistic view (from an organisation-wide perspective), in order to define variables and the relationships of cause and effect that determine the evasions and avoidance. A holistic view is necessary to successfully achieve the objectives of the tax administration. The role of influencing taxpayer compliance and payment behaviour is still a developing and relatively new area for most tax administrations.

The surveyed countries have been asked how they *"define risk analysis in tax debt management and what would be the advantages/added value of using risk analysis in tax debt management"* and the answers vary a lot from country to country. *Netherlands, Slovakia, Spain, Hungary, Portugal and France* have no official definition for risk analysis in

[1] Compliance Risk management Guide for tax administrations, European Commission, 2010, p. 9

debt management. Other countries have defined risk analysis and what benefits and added value risk analysis haves.

Austria's strives to act as soon as possible concerning new debt cases and as strict as possible concerning older debt cases. That means for risk analyses they assess the risk of tax losses and the chance to collect the debts in a defensible time frame. The advantages would be: early contact with non-compliant tax payers in this area; signalling that in cases of not paying taxes, taxpayers are under monitoring immediately; tax debts don't increase in a short time frame. Also, according the Austrian insolvency rules the position of the tax administration can improve by analysing the insolvency risk.

In *Azerbaijan* the main Information and research system of Tax Ministry enables to reveal debtors by filters like date of debt, period of payments, geographical territory, amount, legal entity and natural person. Azerbaijan states that it gives them chances to manage debts very quickly and economise time and resources.

In *Belgium* the risk analysis means for the administration the use of a methodology which enables to recover fiscal debts on the basis of a process of using segmentation of taxpayers (including the use of data mining methodologies). The use of risk analysis enables the administration to recover tax debts on a more targeted basis. This kind of targeted approach will be necessary in the future, taking into account:

- The continuous decrease of the number of staff (budgetary restrictions) during the next years,
- Changing socio-economic factors.

In *Bulgaria* risk analysis is the examination of financial or solvency conditions of companies. Classification of debtors is done on collectable, partially collectable and hard collectable. The risk analysis is defined as predicting risk debtors and preventing further debt and it gives prognostic information about debtors.

In *Denmark* it is fundamental to use all risk analysis in their work on recovery. Currently, they use the level of debt; type of debtor (e.g. individual or company) and branch of industry are indicators. Risk analysis allows Denmark to prioritize and target their efforts.

Estonia has an analysis which shows if a person is a potential long-term debtor. They used to use a model that calculated a risk level for taxpayers. The level would vary from high to low. Now they are replacing it with a model which predicts the age of the tax debt (shows the probability of when the debt might be paid and divides debtors into groups accordingly). Such analysis allows Estonia to use different approaches on different groups of debtors so they can put the most effort into dealing with high risk debtors.

In *Ireland* the debt management is about maximising cash flow to the central fund and risk analysis is about identifying those factors that impact on preventing maximum tax cash flow to the central fund. Risk analysis helps to segment the case base into high, low and medium risk and therefore implement strategies that need to be implemented for each category so as to maximise the Revenue debt management impact.

Italy determines the cause-and-effect (causal) relationships between probable happenings, their magnitude, and likely outcomes; especially, identification of non-compliant taxpayers' behaviour who get rid of property/assets before we they attach them. The benefit of using risk analysis is the assessment and the choice of the most efficient and effective treatments.

In *Latvia* the risk analysis in the area of tax debt management is a tool as a result of using which the future revenue loss can be prevented or reduced. As a result of the use of risk analysis in the area of tax debt management budget revenues could be increased, enforcement procedures made more effective, taxpayers which could evade payment of delayed taxes would be identified quicker and timelier by estimating their solvency and identifying the priority tax debtors. Tax administration could also use better work methods applicable to tax debtors, for example in deciding if it is useful to grant the extension of payment terms, to apply precautionary measures etc., and also to evaluate the usefulness of the continuation of recovery procedures.

Malta defines risk analysis in debt management as the process of identifying and prioritising risks to the collection of revenue and identifying adequate treatment and evaluation methods to minimise such risks. Rather than having a one-size-fits-all solution, risk analysis permits the tax administration to stratify the population according to identified risks and adopt the most cost-effective method for each stratum. A strategic approach also reduces the risks of losses through statute-barring.

Norway's holistic approach is through a method to find, understand and manage existing and potential risks that might prevent the Norwegian Tax Administration from achieving correct and timely assessments of taxes, timely payment of taxes, and good service to users/taxpayers.

Republic of Srpska (BiH) uses risk analysis in debt management to predict the future state and behaviour of the taxpayer by analysing the past and present state and behaviour of the taxpayer. The main advantage they see in using risk analysis is to be more efficient in the collection of tax debts.

Sweden does not have a separate definition of risk analysis within debt management area but one on a general level. It is a mean for the tax administration to help reach its long and short term goals. Risk management offers a structured approach to utilize the agencies' resources as effectively as possible. The major benefit of risk analysis is making the best use possible of current resources. It is a method of thinking and helps to focus on causes of problems and solving them rather than consequences of the problems.

In *Switzerland* the risk analysis in tax debt management is used to predict the probability of payment default or delay by a taxpayer. Then smart methods can be selected to tackle it as early as possible. Switzerland thinks that the advantages are that it offers the possibility to choose the best (or a better) strategy with some taxpayers (stronger and faster for some and more flexible for other) in order to reduce the loss for the state budget. Another advantage is that the recovering strategies are applied in a systematic way as to increase the equality of treatment between taxpayers.

The United Kingdom would describe risk analysis as 'analytics' and the aim is to look at the debt and taxpayer behaviour and find a solution that achieves payment or clearance and the ideal would be to encourage the taxpayer to be compliant in future. The aims for using risk analysis are to get a better understanding of the reasons why the taxpayer has not paid and to find a solution to achieve payment or clearance. This method saves resources and at the same time gives greater success in achieving payment.

4.3 Summary

Most of the surveyed countries answer that they believe the ideal would be to encourage the taxpayer to be compliant in the future and that is important to know what causes non-compliant behaviour by citizens and businesses and matches its strategy to the taxpayer's attitude. Risk analysis is used as of a methodology to enable tax administrations to recover fiscal debts on the basis of a process of using segmentation of taxpayers.

Azerbaijan, Belgium, Bulgaria, Denmark, France, Netherlands define risk analysis as a classification of debtors by filters.

Particular reference to the importance of understanding the tax payers' behaviour come from *Ireland, Italy, Republic of Srpska, Switzerland and United Kingdom.*

It is important also to emphasize the typical *Norwegian* approach considering the risk that might prevent from good service to users/taxpayers. This means that influencing of taxpayer behaviour will lead to effective and efficient use of different enforcement instruments based on knowledge of the behaviour and of the risks related to taxpayers.

All tax liabilities should in principle be the subject of a more targeted approach by selecting a similar tax debts for which an identical recovery procedure can be applied. Tax administrations have to decide the level of risk of non-payment, to which taxpayers the risk relays to and how the risk ought to be treated to achieve the best possible outcome.

Some countries did not give an official or statutory definition of risk analysis but everyone thinks that it is a fundamental approach to find, understand and manage existing and potential risks that might prevent tax administrations from achieving correct and timely assessment and payment of taxes.

And although the definitions of risk analysis differ, the benefits and added values are similar in the answers from the surveyed IOTA members. Benefits and added value that most of the countries have listed are:

- The rational and more effective use of human and technical resources, to be able to allocate means and workload more efficiently.
- It is an efficient way to reduce the amount of debts.
- Risk analysis makes it easier to choose between cost-effective approaches.
- Risk analysis ensures equal treatment of taxpayers.

5 Risk analysis as a part of debt management strategies

5.1 Introduction

A central objective of a tax administration is usually to collect the correct amount of taxes at due time. In all countries, some taxpayers fail to pay their taxes due to ignorance, carelessness or deliberate actions, as well as weakness in the tax administration. Therefore, a tax administration should have a strategy that strikes a balance between traditional enforcement activities and innovative treatments seeking more effective ways to get high levels of payment and high taxpayer satisfaction.[2]

In a dynamic environment, tax administrations need to be alert and responsive to all kinds of risks that impact on its strategic direction which in turn could impact on its future viability. It is obvious that any risk to the future viability of a tax administration will impact on its capacity to manage and improve tax compliance.[3]

In order to keep the amount of tax debt to a manageable level, tax administrations have to adopt a strategy to accomplish it. Risk analysis is considered to be a useful element in this strategy.

A strategy could be a set of methods, principals and ways of thinking based on knowledge. Knowledge is a very important part of risk management regardless of risk model, structure and definitions. Risk management is of no use without insight in the tax gap, taxpayer's behaviour and the effectiveness of different treatments. With the right mix of knowledge, principles, a way of thinking and methods it is possible to work towards improved management of risks associated with non-payment.

For the countries that have described their strategy for using risk analysis in debt management it is established at different levels of the organizational structure in tax administration. 11 countries out of 21 surveyed indicated that they establish the strategy nationally, 2 countries locally and the rest have a mix of having established it at all three levels.

5.2 No strategy

A few countries have replied that they don't have a strategy for using risk analysis in debt management or that they are in the process of developing it.

In *France* the strategic direction is currently being devised. When the overall strategy is to be issued, the tax debt management will be lined in accordance with it.

[2] Compliance Risk management Guide for tax administrations, European Commission, 2010, p. 8

[3] Compliance Risk Management: Managing and Improving Tax Compliance, OECD, October 2004, p. 16

The Netherlands are still in the process of developing a policy. Several possible strategies are tried out "pilot-wise".

Republic of Srpska (BiH)'s tax administration is in the process of implementing a new integrated IT system and this system will provide them with a quality risk analysis.

Slovakia does not have an analysis in debt management or a strategy, because of other priorities in area of risk analysis. They are creating a new tax administrative IT system at the moment. The current approach is only general under law, using only general procedures, but exceptional cases are handled individually.

5.3 Risk analysis in debt management is integrated in other risk analysis areas

Ireland and Latvia don't have a specific strategy for risk analysis in debt management, but it is instead included in a more general risk analysis or in a compliance risk analysis:

In *Ireland* the risk analysis assists the tax administration in applying appropriate resources to those areas that pose the greatest risk to the tax revenue. Risk analysis also ensures that scarce resources are used effectively in targeting particular sectors to ensure there is an adequate revenue presence across the whole tax base. The risk-runs for audit and debt management are completed on a quarterly basis. Risk runs ensure that taxpayers submit their returns with payment by the due date, and in their absence follow up with appropriate recovery actions.

In *Latvia* there is no particular strategy for the use of risk analysis in the area of tax debt management that so far has been developed by the SRS tax administration; however the tax debt management risks are included into the SRS Tax Compliance Strategy which was introduced in 2010 and is updated every year. Up to now only some preliminary work has been done regarding the use of risk analysis in the area of tax debt management and risk analysis is still a manual process. In order to reduce the possibility of tax avoidance and evasion as a result of fictional insolvency, some fictional insolvency risk indicators have been identified.

5.4 Strategies with principals

Belgium, Denmark, Sweden and Norway have implemented a few principals in their risk analysis strategy like planning and prioritisation based on cost efficiency, knowledge, skilful execution and constant improvement through evaluation.

The *Belgian* tax administration states that a specific approach within the debt collection and debt enforcement process takes in account the following basics:

- All tax debts should in principle be subjected to an appropriate recovery procedure;
- An increasing number of tax debts need to be recovered and at the same time the number of staff is declining;

- A targeted approach by selecting similar tax debts (segmentation) to which an identical recovery procedure can be applied, is more efficient.

This working method and the use of data mining methods, leads Belgium to a more efficient recovery policy. The strategy was implemented in 2003 and is continuously evaluated and updated.

In *Denmark* the strategy covers:

- The use of the recovery tools that will be the best in a given particular situation;
- The cheapest tool;
- Resulting in the largest revenue.

So in order to be as efficient as possible, they cover as many arrears as cheaply and as quickly as they can. But Denmark also takes in consideration the social position of the taxpayer. Their strategy is reviewed as often as it seems to be necessary.

The *Swedish* Tax Authority has a general strategy for risk management they also apply in the area of debt management which is updated once a year. Their risk management model could be seen as "structured common sense" and is based on focusing on what they want to achieve: planning and prioritisation based on knowledge, skilful execution and constant improvement through evaluation**.** The model consists of five steps: identifying risks, analysis, assessment & prioritisation, implementation and finally evaluation. It is used primary as a decision-making tool for choosing the right treatment methods (e.g. reminders, third party liability, information campaigns) for reaching the objectives of the administration: full payment and at due time.

In *Norway* the strategy is to make risk analysis as a part of the daily work in order to keep the focus on the main goals all the time. Their strategy for risk analysis is based on four steps:

- Identifying and making priorities of risk
- Methodical external and internal analyses to identify risk that might prevent correct payment
- Determine how to discover and select the optimal measures
- Evaluate and improve the way they solve their tasks.

All regional operational units must carry out a risk analysis within tax debt management each quarter and report this to the National Norwegian Tax Administration. The risk analysis was first implemented throughout the entire organization in 2008. Risk analysis plans are developed and updated for the most part quarterly and at least once a year.

5.5 Strategy is identified by using classification and segmentation

Most of the countries have replied that their strategy is to use some form of classification and segmentation of the debtors and the debts with the help of risk indicators in the area of risk analysis in debt management.

In *Austria* the strategy is to collect taxes in the correct value and in due time. This means to act as soon as possible concerning new debt cases and as strict as possible concerning older debt cases. For the risk analysis, they have to assess the risk of tax losses and the chance to collect the debts in a defensible time frame. The reaction to non-payment of new debtors depends on the type of tax, the value of the tax, the history of the tax payer and so on. For older debts, the target is to avoid tax debt increase and to find a solution for payment or start an insolvency procedure. This strategy is older than fifteen years and it is updated every year.

In *Azerbaijan* the Tax Administration reveals a list of tax debtors which is classified according to their risk category due to the history of debts. If a taxpayer is not likely to pay, they put them in a high rate risk category. The strategy is updated once a year.

Estonia will soon implement a strategic goal to decrease the amount of tax debt. Estonia is using a new model which analyses risky behaviour and will be able to detect potential new long-term debtors early on and start the necessary proceedings to try to prevent the worst case scenario.

Hungary only uses risk analysis to payment by instalment. Their system will examine the following circumstances:

- Whether preconditions set by legal rules are satisfied;
- Components of the debtor's wealth;
- Revenue data;
- Indicators.

The system associates scores to the given pieces of information. Finally, the system generates a total score on the basis of which, and in accordance with objective criteria, a decision is made on the best approach.

Tax administration in *Italy* strives for a customer oriented tax organisation and, as a mission, the payment of taxes is the central objective. They produce recovery actions with calibrated criteria relating the amount of tax debt and taxpayer's property/assets. The strategy was implemented in 2007 and it is dynamic and updated in function of compliance changes of the economic and social scenarios.

Since the second half of 2010, the *Portuguese* tax administration implemented a debtor's segmentation based on the full amount of the debt. That strategy of segmentation was a response to the reality presented by the numbers: debtors over 100.000 EUR representing only 1% of the debtors in general, were responsible for about 90% of the total debt portfolio. Portugal does a close follow up on strategic debtors (debtors with high debts) when the debtors fill in the inclusion criteria in an IT system called SIGIDE. This analysis started before 2009.

The Tax Administration in *Spain* first uses segmentation in risk analysis to cope with the huge volumes. Through segmentation they select the best procedures in comparison to the amount of debt. The second step consists of using an open and flexible IT system that

allows elaborating ad-hoc consults according to the necessities required in every precise moment. By crossing data and information they select the group to deal with. And once the group is identified it helps them to choose between measures. The whole system is based on data-mining, flexible and open software and a great deal of information coming from a great deal of sources. It allows Spain to manage their debts, even the smaller once, and to select and carry out collection and recovery actions. This system has been working for more than fifteen years and is continuously improved and it is updated technically and also from the point of view of new data to be incorporated.

Switzerland uses a differentiated approach for each type of taxpayer:

- Fast and strength against fraudsters
- Flexibility with the other
- Innovative approaches based on nudging so as to optimize the relationship with the taxpayers.

The *United Kingdom* started to pursue debts through campaigns in 2012. The Campaign Teams design a front to end set of planned activities to achieve debt clearance. For now, the campaigns are broadly on the basis of tax type and costumer behaviour. The campaigns are still on going with improving in sophistication and analytics in early stages. A new IT-system will soon be released.

5.6 Summary

A strategy is as a business road map. This could be defined as a broad plan developed by an organization to take it from where it is, to where it wants to be. A strategy is meant to help an organization in reaching its goals while constantly allowing it to monitor its environment to adapt the strategy as necessary. Strategy generally involves setting goals, determining actions to achieve the goals, and mobilizing resources to execute the actions.
A strategy describes how the goals will be achieved with existing resources and it involves activities such as strategic planning and strategic thinking. Strategy also typically involves two major processes: formulation and implementation. The head office is generally tasked with determining a strategy. It is interesting to make the comparative analysis of country information identifying similarities and differences which strategy to use and at what level this decision is made, what are the reasons for choosing a particular strategy, what strategy is used and why.

From the answers that were submitted from the IOTA members it is hard to draw any distinct conclusions. But one thing that is evident is that all countries have a strategy in risk analysis of debt management or are in the process of developing it. All the strategies are designed or planned to serve a particular purpose. The purpose for the strategy in debt management must be to collect as much of the determined taxes as possible with a minimum level of costs.

The country's replies differ a lot on how the strategy was set up. *Ireland* and *Latvia* do not have a separate strategy for debt management, but it is instead included in the area of compliance or a general risk strategy for all different risks.

Sweden, Belgium, Denmark and *Norway* are focusing their strategy more on the strategic approach that is focusing on the risk valuation. It is more of an overall strategy for how the tax administration will reach the goals in the debt management in a long term.

Several countries replied that they define the strategy according to the goal and the tactics or policies that they are using to reach the goal. The definition of the strategy is related to what kind of segmentation or classification is used in the risk management process. This way of defining the strategy is more focusing on the implementation, on the inflow, on the effect of the debt collection and on the risk indicators.

It is obvious from the replies that all IOTA members find it important to have a strategy even though the definitions vary a lot from country to country. One thing that seems to be in common, throughout all the answers is that the strategy reaches the goals that the tax administration has, and that the strategy bridges the gap between policy and tactics. Together, strategy and tactics minimizes the gap between ends and means.

6 The use of risk analysis in different stages of debt management processes

6.1 Introduction

These days many tax administrations are taking steps to transform themselves into taxpayer-centric organizations. They are gathering taxpayer data from operational systems and are creating a single taxpayer view. In the ideal taxpayer-centric organization, everyone understands that learning from each taxpayers' interaction and the ability to use what has been learned, can help to better act upon taxpayers' non-compliant behaviour.

The term "risk analysis" can have many different meanings depending on the area in which it is used. Risk management can be defined as a technique to improve the tax administration's effectiveness in dealing with risks. It can help us to better choose between the available risk treatment options. Risk management helps the tax administration to operate more effectively in environments influenced by risks.

The risk analysis process is dynamic and structured and it supports us in identifying the different steps in the decision-making cycle. The risk analysis process is a repeated process that consists of defined steps to support improved decision-making and it allows us to better measure the quality of each of the individual stages of the decision-making process as well as assists us to detect mistakes easier.

There are many different factors to be considered in the risk analysis process within the area of debt management. External factors affecting taxpayer's willingness and ability to pay are legislation, government policy, public opinion and economic conditions. Internal factors are organizational structure, resources and data access. These can range across the economical level, the governmental level, the national and the regional level. [4]

The use of risk analysis in tax debt management requires a structured and systematic process for deciding what is important in mitigating the risk of non-payment and how major tax compliance risks should be addressed. A risk analysis process describes the process of how to locate the major risks of non-payment and what action is suited for minimizing the risk.

Risk analysis allows the tax administration to deal with risk by monitoring the behaviour of the taxpayers that are causing the risk. This means taking deliberate actions to improve the odds of a good outcome and reducing the odds of a bad outcome in objectives. It helps to minimize risks which appear to threaten our objectivities and to provide us with a quality assurance for our actions.

[4] Compliance Risk management Guide for tax administrations, European Commission, 2010, p. 14-16

The most important steps in the process are:

- Risk identification (getting a clear understanding of the risks involved)
- Categorisation and analysis of risk indicators (grouping associated indicators)
- Prioritisation of risk indicators (which are the most significant)
- Selection (results in selection lists of targets for collection/recovery procedure)
- Evaluation of the whole process

The principles and key elements are equally applicable for identifying tax compliance risks associated with non-registration, non-filing and non-payment. It allows us to make explicit and better decisions in each step of the process before moving to the next one.

6.2 Step 1 - Risk identification in tax debt management

Risk identification is an important first step because if the risks are not detected in this phase of the debt management process, they are unlikely to be identified and covered later on. The earlier a risk can be identified, the earlier it can get the right treatment. A shorter time between detection and treatment reduces the risk of non-payment and increases the preventive effect.[5]

The step of identifying risks based on objectives describes all potential risks, trying to answer the question "what can go wrong". It produces a register or a map of all known risks divided into specific risk areas.

There are several sources available to identify risks, for instance the use of a range of data and data manipulation techniques, accompanied by analytical tools and indicators to identify risk and assess their significance[6]. Risk identification can be successful by a balanced and combined use of the relevant data.

The cause and impact of risks are two other important factors to consider during the risk identification phase. It is important to determine the origin of the risk in order to understand its causes.

In the area of tax debt management, risk identification helps to determine which debtors the tax administrations need to focus on first and which approach is going to be the most effective. In order to do so, tax administrations in various countries have adopted different methods of identifying and determining the risks they want to tackle.

[5] Compliance Risk management Guide for tax administrations, European Commission, 2010, p. 25

[6] Compliance Risk Management: Managing and Improving Tax Compliance, OECD, October 2004, p. 23

These risks can be categorised into the following four categories:

1) Risks related to the debtors:

- Tax fraud and tax evasion
- Non or late payment of due taxes
- Incorrect assessment of tax by error
- Non-submission of both payments and returns
- Bad company policy and incorrect investments
- Insolvency, bankruptcy

2) Risks related to the debts:

- ageing of tax debt (old debts are likely not to be paid/collected)
- mounting of the debt

3) External risks:

- Economic and financial situation of the country
- Existence of a grey economy

4) Internal risks:

- Unavailability and bad quality of data
- Lack of communication
- Inefficiency in the tax collection

The above mentioned risks are the most significant ones because of their impact on the tax administrations as well as on the revenue collection. They can all lead to non-payment of taxes, and therefore need to be tackled by the tax administrations in order to secure effective debt collection.

Some of these risks can only be reduced by means of early intervention: (a) the amount of tax liability can increase in a very short time and if tax administration is delaying with response it will be more and more difficult or even impossible to reduce and/or collect these debts; (b) if the time gap between tax fraud or tax evasion and the detection is too wide, collection might no longer be successful.

6.2.1 Risk determination by using key risk indicators

The determination of the risks is mostly done by combining different key risk indicators. These indicators vary from country to country depending on tax policy, availability of information, IT support, prioritisation, etc.

The most used indicators named by the 21 responding countries, in order of frequency, are:

Key risk indicators	Used by number of countries
1. Amount of tax debt	20
2. Tax debt history	18
3. No submission of tax return	18
4. Type of business entity (legal form)	17
5. Age of tax debt	16
6. Economic activity (e.g. NACE)	15
7. Late submission of tax return	15
8. Number of tax debts	14
9. Insolvency	14
10. Property/assets	13
11. Fraud	12
12. Address abroad	12
13. Unknown address	12
14. Liquidity	12
15. Solvability	10
16. Number of employees	10
17. Location of a tax debtor	8
18. Type of tax overdue	8
19. Involvement in criminal activity	8
20. Statute of limitation	6
21. Location of establishment	3

Several methods can be used when deciding on which key risk indicators to include for selection:

- Rule based selections - fewer risk indicators are used to build a rule;
- Scorecards - created and tested with auditors using a small amount of risk indicators;
- Data mining - there is an opportunity to test a huge amount of potential risk indicators.

IOTA members have their own way of determining these risks due to, for example, different organizational structures of the tax administrations and/or due to IT systems. However, the above mentioned varieties do not necessarily suggest different stages of the risk determination process or different outcome.

The steps the *French* tax administration undertakes to determine the risk indicators vary, because they mainly depend on policy approved by the heads of local offices. The French legal framework sets a personal liability for uncollected debt, which leaves managers of local offices a certain degree of autonomy to define their own debt management policy, even if they have to meet targets set by regional directors. Nevertheless, the heads local offices are focusing on the following main risks: tax audit debts, time-barring, amount of debt, failure to comply with instalment arrangements, receiverships of bankruptcy.

In *Austria* all the information needed for risk determination is available in the tax account system. In order to find cases which meet the conditions of the main risks, tax officials use a special part in the IT system, where they can choose risk indicators. For example, amount of debt, type of taxes, age of debt, etc. Once the conditions are established, a systematic analysis is performed selecting the tax debtors within the same branch and category. If the level of debt is higher than the average of this group of tax debtors, the risk is also higher. This is followed by making a direct contact with the selected tax debtor.

The risks within the debt management area are identified in a simple and clear way in *Sweden.* However, their treatment remains a real challenge. In general, the Swedish Tax Agency mostly uses a top-down approach to risk management where the strategic risks are identified by the management and are further broken down by operational units. Tactical risks are coordinated by central office, but they are identified at regional level. Each region has designated nationwide responsibilities for certain risk areas (e.g. micro businesses at Northern Region, cash sector at Western Region). Regional representatives are also taking part in reference groups when prioritisation and allocation of resources are made. The ambition is to make the risk assessment and the prioritisation a holistic view for the whole country. For risk treatments, each region takes responsibility for leading nationwide compliance projects involving all regions. The knowledge at operational and taxpayer level could also, especially in the longer run, influence the strategic risks (bottom-up approach).

The United Kingdom monitors risk trends and levels. This includes new debts, the age of debt, the amount of write-off remit etc. They compare these with previous periods and with the currents trends. For overall debt management they use staff monitoring, debt clearance and payment rates for performance purposes. The constant aim is to improve performance and design campaigns to clear debts more quickly. The campaigns are tailored to types of debts and types of debtors. The campaign is a set of activities – i.e. phone call, purpose designed range of letters. When designing the campaign they assess a volume and value of debts in that particular segment and they monitor the results.

Latvia uses a wide range of risk indicators for determination of risks in debt management:

- The official of taxpayer's company is at the same time an official of another taxpayer whose company has been given the status of a "fictitious" enterprise;
- The legal address of the taxpayer, the address declared by the official (participant) of the taxpayer have to be regarded as risky (shelters, prisons, care homes etc.);
- The official or a relative of the official are at the same time officials of other companies that have accumulated tax debts and who are failing to file the reports required by legislation;
- Participant (or participant's relative) of the taxpayer having tax arrears has founded a new company;
- The taxpayer has not made the mandatory social insurance contributions for more than two months, and has delayed other tax payments for more than three months;
- The taxpayer has failed to file the returns and reports required by legislation for more than three months;
- Transaction partners of the taxpayer are taxpayers having the status of "fictitious" enterprise;

- The taxpayer who has delinquent tax payments, is changing the name of the company or appoints a different official representative whose residential address can be regarded as risky;
- The taxpayer has fired all staff or significantly reduced their number;
- The taxpayer registered as VAT taxpayer has been excluded from the register of VAT taxable persons;
- More than 30% of the employees have taken jobs at another company within one month;
- The taxpayer who has difficulties in paying off the delayed taxes, has reduced the amount of basic stock and assets;
- The taxpayer suffers losses in his business for a lengthy period of time;
- The taxpayer reports wages smaller than minimal wages in the period of taxation.

6.2.2 Matching key risk indicators

In order to decide which intervention to apply to a tax debtor, tax administrations have to make sure that the mentioned risk indicators can correlate. The way they do the matching of risk indicators, varies from country to county. Here are some examples of how the key indicators are merged:

In *Azerbaijan* the correlation of risk indictors is determined through choosing a special selection tool within the automated system, and the combination consists of active or passive position versus payment interval, tax evasion history and geographical location.

Italy uses age of tax, tax debt history, amount of debt and address abroad as a combination. Another matching is formed by type of business, amount of tax debt, property and assets.

Switzerland matches at the payment history and tax filing history. As for new companies, the payment history of the administrator/director, the credit scoring, the economic sector and the size of the company is chosen for combination of risk indicators.

6.3 Step 2 - Categorisation of risk indicators

The second step in the risk management process is the risk analysis phase. In this phase of the process the identified risk indicators and the formed groups of key risk indicators, are categorised: systematically weighted and grouped in relative order.

Different factors are significant in the risk analysis, for example economic factors and behavioural factors. Economic factors can be such as the financial burden, the cost of compliance and disincentives. Behavioural factors can be such as individual differences, perceived inequity and risk taking. Important aspects of the risk analysis are also the likelihood of happening, the consequence of the risk and the reason why the risks occur.[7]

Some countries form categories after determining the risk indicators to create a further segmentation before their analysis.

[7] Compliance Risk Management: Managing and Improving Tax Compliance, OECD, October 2004, p. 38

6.3.1 Categorisation by debt

Bulgaria segments the debts as collectable, partially collectable and hardly collectable.

Italy makes a distinction based on the amount of debt:

- < € 20,000,
- between € 20,000 – € 500,000 with assets,
- between € 20,000 – € 500,000 without assets and tax debts
- > € 500,000.

Azerbaijan categorises tax debts by date. The information system automatically checks the date of tax debt and creates the list with classified risk categories of tax debts closed to limitation period.

Austria takes in account proportionality of the type of tax and business case in relation to the tax revenue. Taxes with a high percentage of the whole revenue which are payable per month are in a higher category than taxes with a small percentage and/or payment dates once a year.

Ireland first ranks the debts in order of tax yield. The case base is then divided into a number of segments, ranging from the highest yield to the lowest yield in tax collection and recovery. The top 7.000 cases in Ireland give approximately € 28 billion of the tax yield, where the lowest segment has approximately 250.000 cases and give a yield of € 500 million.

6.3.2 Categorisation by debtors

Estonia categorises risks based on certain criteria and debtors are divided into groups - high risk, medium risk and low risk debtors. In case of a high risk debtor, Estonian tax administration acts immediately, so the debtor might only be given 48 hours to pay the tax debt voluntarily or the recovery process will be initiated. Also a high risk debtor might be sent to special proceedings (bankruptcy or third person liability proceedings) sooner than in case of a medium or low risk debtor.

Besides by sort of debt, *Austria* also distinguishes on the base of personal payment behaviour. If taxpayers create debt for a long time or every month they are placed in a higher category than taxpayers with a small number of delays who are paying close to the first reminder send by the tax administration.

6.3.3 Categorisation depending on type of action

In *Sweden* the categorisation of risk indicators is done according to the method that is chosen for the selection. In rule based selections as well as with scorecards it iss a more subjective way of segmenting and categorising the different risk indicators. With data mining it is often done past analysis (when checking different correlations in the data).

6.4 Step 3 - Prioritisation of risk indicators

The third necessary step is to consider which factors are to be taken into consideration for setting the priorities for the identified and determined risk indicators in the area of tax debt management. Besides setting the priority for risk indicators, it is equally important to consider in which priority the corresponding treatments will be applied to tackle the determined risk as it will also allow to effectively allocate the required resources and tax officers on selected cases.

Before planning any response and taking an action to deal with the risk of non-payment, tax administration need to make sure that the risks are assessed in terms of their potential impacts on revenue collection.[8] The extent of the risk gives an indication of the direct loss of tax if the risk was to be accepted.[9] The tax administration also needs to determine, in accordance with a standardised criteria, how the identified risks should be grouped and prioritised. Therefore the main purpose of this approach is to select the tax debtors which belong to the same target group established in the course of analysing risk indicators.

The demands for using different treatments (e.g. bankruptcy proceedings, recovery, etc.) to bring the risk to an acceptable level is always larger than the existing capacity. A prioritisation of actions must therefore always take place. This prioritisation can lead up to the risk being tackled in one of the following ways:

- The risk is addressed by implementing changes in administration of taxes (e.g. changes in tax regulations, administrative procedures, etc.);
- The risk is reduced by a combination of actions (support & assistance and enforced recovery);
- The risk is accepted and no further action is taken (limited capacity, scare resources, lack of political support, etc.).

As a part of risk prioritisation, the major risks need to be distinguished from the minor ones. In the process of assessing and prioritizing risks it is critical to operate with a set of factors common for all types of non-payment risks in order to be able to comparatively analyse and rank them on a regular basis. Assessing and prioritizing risks are basically about quantifying the risks identified in the previous phase.[10]

The risk prioritisation means making a comparison of the assessed non-payment risk against the debt management objectivities of the tax administration. The outcome of this process would be a summary of prioritized non-payment risks that are to be subject to a specific treatment.[11]

The surveyed member tax administrations of IOTA indicated that they take into consideration a variety of factors In order to effectively prioritise non-payment risks. These factors can arise after verification or audit actions and are often decided upon after weighing them for effectiveness and efficiency.

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[8] Compliance Risk Management: Managing and Improving Tax Compliance, OECD, October 2004, p. 36

[9] Compliance Risk management Guide for tax administrations, European Commission, 2010, p. 36

[10] Compliance Risk Management: Managing and Improving Tax Compliance, OECD, October 2004, p. 26

[11] Compliance Risk Management: Managing and Improving Tax Compliance, OECD, October 2004, p. 28

Austria takes into account factors concerning both the taxes and the taxpayers. As for taxes they consider the value and type of tax and if the tax was the result of an assessment of audit or maybe due to fraud. Identifying marks concerning taxpayers are the business category and sector, willingness to fulfil agreements and their financial behaviour.

Tax administration in *Belgium* uses all available data to forecast the financial impact, and takes in consideration political objectives, management objectives, available human resources and the input of operational units in terms of experiences and business knowledge.

Bulgaria considers the amount of the debt, whether the taxpayer owns any assets, the degree of solvability and the latitude of bank credit.

In the *Netherlands* the Dutch tax administration considers the recovery conception date, the age of the debt, the amount due and the declaration behaviour of the taxpayer.

Norway distinguishes between different types of factors:

- Factors concerning taxes
  - Type of tax overdue
  - Amount of tax debt
  - Number of unpaid tax
  - Total amount owed

- Factors concerning taxpayers
  - Tax subject (company, self-employed, individual)
  - Tax debt history
  - Income
  - Amount due compared to income
  - Benefits/pension
  - Property
  - Residential history

- Factors concerning social marks
  - Interest rate
  - Net wealth
  - Lending rent

After the risks have been identified by the *Swedish* Tax Agency, an analysis is made for each area by describing the risk as thoroughly as possible with regard to the scope, underlying causes and the characteristics of the irregularities. This includes determination of what kind of errors and fraud can occur, which taxpayers are responsible and the reasons behind their behaviour. In order to assess the risks it is necessary to have knowledge of the number of irregularities (e.g. deductions in a tax return), of the amount and of the population (e.g. number of taxpayers) involved in a certain risk area (e.g. construction, restaurants, etc.). With this knowledge (among other) it is possible to weigh the risk in relation to other risks.

The weighing can be done in many different ways but that does not affect the model in itself. The core of the model being applied is feeding the results from the previous steps: by considering all analysed risks, if these risks should be treated and which of them are most urgent for treatment. The list of risks is updated regularly when new information becomes available such as evaluation of activities carried out under the National Compliance Plan. The Plan sets out which resources should be allocated for each activity and who is responsible (e.g. one or several tax regions).

In the *United Kingdom* the tax administration is only able to distinguish between tax type, debt value, debt age and historical taxpayers' behaviour. When the risks are being ranked, an appropriate treatment has to be chosen to create the best possible effect**.** One of the possibilities is anticipating a situation of tax irregularities or frauds before they might occur and then taking preventive actions. A combination of different types of treatments could be applied in order to gain the maximum effect for debt management.

6.5 Step 4 - Selecting target groups for collection/recovery procedure based on prioritised risk indicators

Once the risk indicators are prioritised, tax administrations can attribute them to different target groups based on the following:

- Tax debts:
  - Size/value
  - Age
  - Debt type (VAT, personal income, corporate income, social contributions, etc.)
  - Frequency of tax obligation (in terms of filing, payment, etc.)
  - Cause/nature of the debt (as a result of assessment, auditing, fraud, etc.)

- Tax debtor:
  - Category (legal entity, individual)
  - Size of company (large, medium, small)
  - Economic activity
  - Location (geography)
  - Property/assets (liquidity)
  - Employment status

- Tax debtors behaviour:
  - Filing
  - Payment
  - Response to contact by tax administration
  - Involvement in criminal activity (including fraud)

Segmentation on amount of debt, date of debt, position (active of passive), type of debts (man debt, interest or penalty) or type of tax (income, profit, VAT, property tax) are the

most commonly used. For the debtor the classification is done by compliance behaviour, category of debtor, size of company and economic activity.

For instance splitting up the debts in tiers like *Bulgaria* does:

- Level 1: from 2,500 EUR to 50,000 EUR
- Level 2: from 50,001 EUR to 250,000 EUR
- Level 3: from 250,001 EUR

The *Luxemburg* tax administration does the classification of the debt by size, age or frequency of tax obligations. The frequency of tax obligations (filing, payment) is divided into different levels:

- Level 1: monthly obligations (high risk)
- Level 2: quarterly obligations
- Level 3: annual obligations

The tax administration in *France* uses the tool "Miriam" for classification:

- Amount of debt (> 10,000, > 5,000 and < 10,000)
- History of payment: last payment, warning signal when due date is over 2 months
- History of enforcement procedure: warning message when last enforcement procedure is beyond 2 months
- Supervision with warning message along all bankruptcy procedure.

All these warning messages are doubled with detailed lists of debtors.

In Tax Administration of *Republic of Srpska*, debt is classified only by value, in general terms. Even if the cause or nature of the debt is known, it is not used for further analysis and/or classification. Cases pertaining to lower debt amounts originating from unpaid fines (traffic, court fees, etc.) are assigned to junior officers, and more complex cases (taxes) with higher value of debt to senior officers.

In *Russia* the classification of the debt due to its value is provided by the tax legislation. Classification of the debtors is regulated by the internal rules applied by the tax administration. The debts are classified based on the type of the budget (or non-budgetary funds) they are paid to. One of the functions of the Special Diagnostic Program "Diana" - to control the terms for starting the recovery proceedings - is based on this classification.

Regarding the cause of the debt, debt as a result of assessment, standard recovery proceedings would be applied. Debt resulted from tax audit, additional guarantee measures can be used (injunctive measures imposed by the tax administration). Russian Tax administration takes into consideration the information about the payments during the previous 3 years and the presence of the current tax debt enforcement measures. Special automated system (database) is used for both purposes.

Financial Directorate of the *Slovak Republic* does use classification/segmentation in debt management mainly for publishing tax arrears, writing off tax arrears, selling non-collectible arrears to state legal person "Slovenská konsolidačná, a.s." and for statistics using. Slovak Republic applies segmenting/classifying a debt according to value in different levels:

- Level 1: from 3 EUR to 170 EUR
- Level 2: from 171 EUR to 10,000 EUR
- Level 3: from 10,000 EUR.

The segment of a debt according to its cause is tax arrears, interest and penalties; debt from tax audit and tax assessment by tools.

In *Slovenia*, they make a general selection in three mayor areas:

- Tax enforcement:
  - Share of the tax debt due to all loads
  - Share of overdue tax debt due to all loads
  - Share of payments in relation to overdue charges
  - Number of tax debtors

- Tax accountancy:
  - Failed entries
  - Overpayments, compensations
  - Limitation of tax debt

- Tax supervision
  - Share of timely recorded and posted loads

In *Sweden* the SEA (Swedish Enforcement Authority) focuses on first time debtors and that has been successful. First in finding property to seize from these debtors and second in influencing them to try to have better control of their economy and pay their debts in the future. The SEA separates companies from private persons. The SEA is starting this September to divide the debtor into three investigation tracks - see news flash.

The Swedish tax administration segments risks and tax payers according to:

- New debtors » prevent the occurrence of arrears by acting in the right time
- Late payers » prevent further accumulation of arrears
- Previous debtors » prevent further accumulation of arrears
- Huge arrears » keeping tabs on debtors

This only concerns segmentation. When it comes to risk scoring Sweden uses a lot of different indicators, for example frequency of tax declarations, payments, historical non-payments etc. Levels are starting from 30.000 SEK (3,250 EUR) and up to 1,000,000 SEK (108,330 EUR).

The Swedish tax agency prioritises information from taxation, for example information from an Auditor that a company will have problems with payment when an audit is completed or almost completed. Apart from that it is only our data mining selection that will create tax collection cases. The selection of taxpayers for Tax Collection cases is made on a national level and then distributed by IT-system to the regions for action. This makes it easier to control and plan the number of cases to be handled monthly and choose which segments should be prioritized.

The *United Kingdom* selects all tax debts and debtors to ensure integrity of all the taxes. They run campaigns in line with the tax calendar, for example at the financial year end for

company taxes. There are various similar deadlines throughout the year. They have to be cost effective so their choice of action had to be in line with the value of the debt. They segment by tax type as the first step so all debts receive some activity. The higher the value of the debt, the more opportunity there is for a cost effective activity. The systems do not currently distinguish by reason for the debt.

The *Netherlands* makes a distinction between the risk indicators identified for direct taxes versus indirect taxes, for compliant versus non-compliant taxpayers and efficiency (chances of successful recovery) versus amount due. Debtor's historical records are taken into account.

Ireland makes a clear distinction between the different specific areas. As for the type of tax debts, they use a series of interventions supported by an IT system, so the appropriate interventions based on the mentioned risk indicators are applied. Another IT system identifies patterns of taxpayer behaviour, e.g. late payment etc., and such cases are selected for intervention.

In *Latvia* tax debtors are selected for recovery procedures with the following priority:

- New debtors whose debts have arisen within receding month and is not exceeding 70 EUR
- Tax debtors whose debt was established as a result of a tax control
- Tax debtors having debt of mandatory social insurance contributions
- Tax debtors whose tax arrears are close to three year statutory limitation

The tax administration in *Malta* uses various approaches to debtors based on their willingness to be compliant. Taxpayers who are likely to respond positively to enforcement are primarily contacted by telephone. On the other hand, taxpayers that have a number of defaults with a negative debt history are normally treated through the use of reminders and official letters stating legal implications for tax non-payment.

6.6 Step 5 – Evaluation

The last step in the risk analysis process is the evaluation. Although there are many different organizational structures and strategies supporting risk management process in tax administrations, nevertheless, evaluation of the operational context in the light of non-payment risk analysis process needs to be coordinated and communication between different structural units has to be maintained. Evaluation can take place at different levels, for example at strategic level or at an operational level. The main purpose of evaluation is to see if the undertaken actions are reducing the risks of non-payment or the most effective actions have been chosen.[12]

For an effective evaluation, non-payment strategies must have be clearly defined, and objectives should be measurable. It is important that evaluation criteria should be determined at the time when the risk treatment strategy is being chosen or developed.[13]

[12] Compliance Risk management Guide for tax administrations, European Commission, 2010, p. 50

[13] Compliance Risk Management: Managing and Improving Tax Compliance, OECD, October 2004, p. 16

Evaluation requires an appropriate preparation so as to support the planning of resources that are going to be used, encourage the use of different data sources, improve the accuracy of the tax administration's reporting and help determine whether alternative interventions should be considered.[14]
There are few members of IOTA who evaluate the effectiveness of risk analysis in tax debt management on a regular basis (e.g. on a monthly or annual basis). Evaluation is mostly carried out by monitoring the value of the unpaid taxes or by collecting feedback from the operational units on revenue collection output. In some countries it is possible to monitor the development of the tax debt levels on a monthly basis. If any significant features are discovered, the reasons behind these features can lead to a change in the risk indicators and/or risk analysis strategy.

Another way of evaluation might happen through the measurement of tax filing and payment compliance: the higher the rate of tax filing and payment compliance, the less likely there will be any creation of arrears.

Sweden carries out the evaluation on both the strategic and the operational level involving analysis on central and regional level at the same time. Examples of their evaluation techniques are surveys and targeted random audit programs performed per region with the objective to monitor certain risk areas. Evaluations are also carried out for a limited number of compliance activities, e.g. the treatment of newly registered businesses.
Evaluation most significantly involves measuring the effects of the risk treatments. Also, the Swedish Tax Agency makes an evaluation of each activity implemented and carried out under the National Compliance Plan. The evaluation points back towards one or several specific risk areas and update the knowledge concerning the characteristics of irregularities and the effect of the interventions taken. This information will then update the first steps of the model (risks identification and analysis) and the relevant output documentation.

In *Belgium* the evaluation phase focuses on two aspects and takes place on two levels of the organisation:

- The feedback elements which are provided by the operational units involved in a particular targeted recovery action can lead to an adjustment of used risk indicators or used data. This feedback particularly concerns possible reaction of taxpayers to the used recovery measure, the "local knowledge" of the tax officers, etc.;
- The feedback elements which are provided by the central unit in charge of risk analysis activities concerning budgetary and financial aspects. The financial result of a targeted recovery action or treatment of a selection list as a result of a data mining model will be reported to the management of the tax administration and/or to the political authority.

By selecting certain cases by chance, the State Audit Office (SAO) in *Hungary* examines the legality of payment facility procedures on the whole territory of the country each year. As a result and to conclude its experiences, SAO prepares a report and draws up action plans.

[14] Compliance Risk Management: Managing and Improving Tax Compliance, OECD, October 2004, p. 61

In *Malta* the National Audit Office (NAO) and the Internal Audit and Investigations Department (IAID) conduct periodical audits.

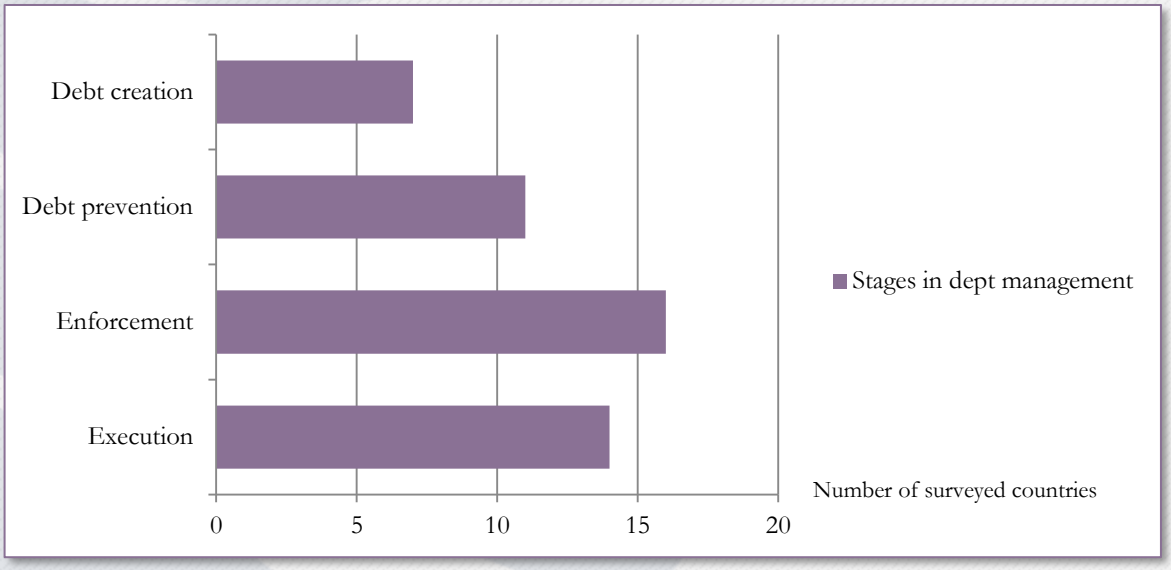
Each year, the National Audit Office of the *United Kingdom* tax administration monitors all performances across Government departments. As this is a vast undertaking, they cannot audit all performances and areas but they do monitor and audit the debt management department every year. Whilst their main objective may not be to monitor how they use risk analysis, inevitably this is a consideration in some of their audits.

6.6.1 Making effective use of the outcome of risk analysis in tax debt management

The responding IOTA members use the outcome of risk analysis in different stages of the tax debt management process. The process can be divided into different stages:

1. Debt creation (getting the tax returns in due time)
2. Debt prevention (getting the payment on the tax returns in due time)
3. Enforcement (persuading tax debtors to comply)
4. Execution (executing assets from tax debtors)

As stated in the diagram below, most surveyed countries use the outcome of risk analysis in the stage of enforcement:

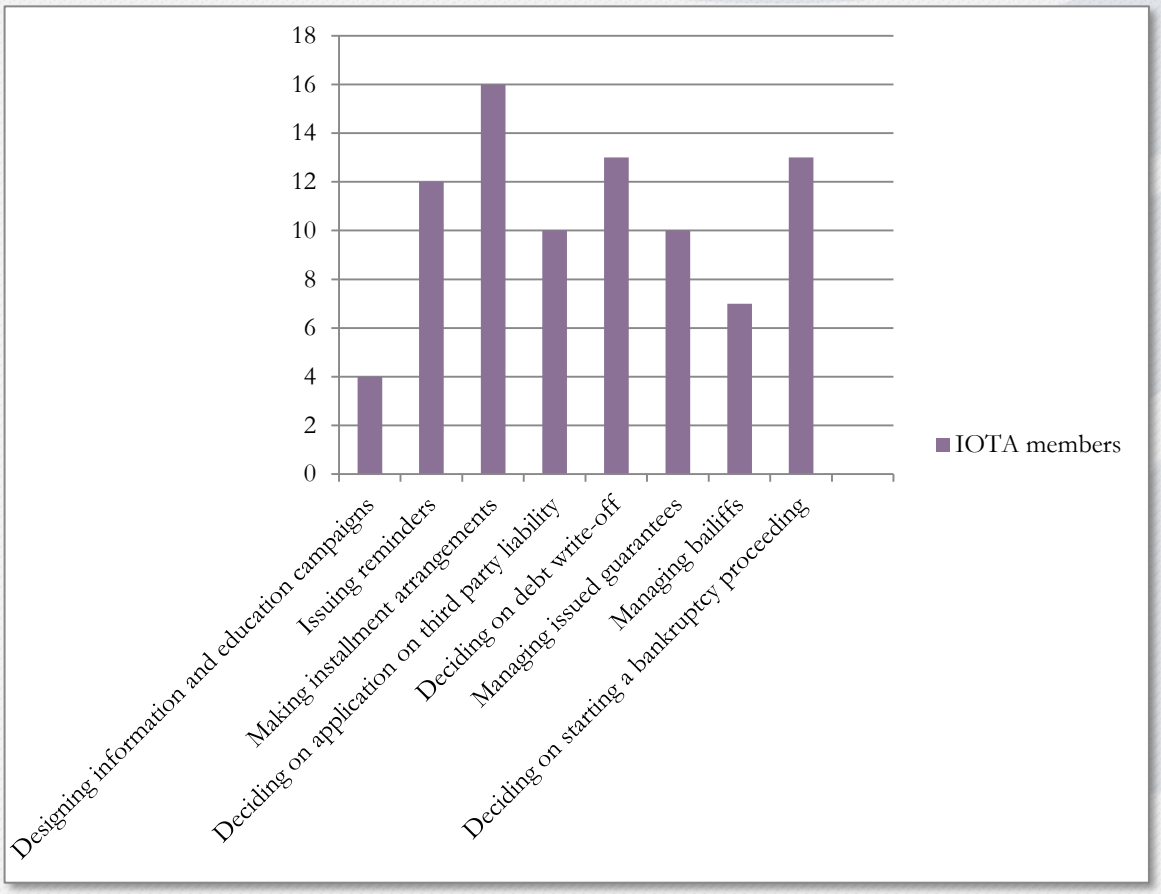


The different stages of debt management encompass a number of tasks to perform by the tax administration:

1. Designing information and education campaigns to minimize the probability of tax debt arising.
2. Issuing reminders as a method of contacting the debtors and persuading them to comply.

3. Making instalment arrangements when debtors are willing to pay but due to lack of means need more time than the due date gives them.
4. Deciding on application of third party liability to make sure the tax debt is covered.
5. Deciding on debt write-off when there are no assets and third party liability is not an option.
6. Managing issued guaranties for the taxes due.
7. Managing bailiffs to make sure they are busy with the collectable debts instead of the non-collectable ones.
8. Deciding on starting a bankruptcy proceeding if enforcement has been non-successful and the tax yield keeps growing.

The diagram on the next page shows how many of the responding IOTA members make use of the outcome of risk analysis when choosing for one of the above mentioned tasks:



6.7 Country examples

6.7.1 Belgium

In Belgium the tax administration uses classification/segmentation in debt management, in the area of risk analysis for the following purposes:

- The implementation of a number of "targeted recovery actions" on a national level.

- The implementation of a new recovery strategy with a focus on the recovery of recent fiscal debts and, depending on the global tax debt, identification of minimum actions that should be undertaken by the local tax offices. For example:
  - Up to a debt of 50 EUR only a reminder is sent to the taxpayer;
  - Up to a debt of 2,500 EUR the local tax offices have to look for sizeable, movable goods, received rents and wages or salaries;
  - Up to a debt of 12,500 EUR a complete investigation of movable and immovable goods is required.
- The implementation of a selection list of new fiscal debts with a value of more than 1,000,000 EUR which are not paid by the due date. In that case, the local management has to undertake immediate action in order to guarantee the recovery of the fiscal debt.

6.7.2 Italy

With respect to debt categorisation and segmentation, the Collection Agents in Italy (in charge of tax recovery and enforcement proceedings) establish the criteria and guidelines instrumental to collect tax debts in a more effective and efficient manner. They generally carry out their recovery activities according to the amount of tax debt, which is the main criterion to be pursued.

The main threshold in the debt segmentation is about 500.000 EUR meaning that above this amount the collection activity will be carried out in a more detailed manner as opposed to collection activities referred to amounts below 500.000 EUR. However, the above threshold may be lowered based on the local environment existing in certain Regions as well as the number of tax debtors included in the cluster.

Furthermore, it is important to point out that, according to the law concerning the recovery of tax debts (Presidential Decree No. 602 of 1973), the Collection Agents are not allowed to seize the tax debtors' real estate in the event their tax debt is lower than 120,000 EUR, while they can place a lien on their real estate as long as the total amount owed is not lower than 20,000 EUR.

It implies that the Collection Agents have to take these rules into account while they are carrying out their recovery activities as well as categorizing the tax debts.

The Collection Agents can apply both automated procedures as well as developing targeted activities. The choice between these different models mainly depends on the amount of the tax debt to be pursued. Subsequently, the Collection Agents take into consideration also the outcomes raising from the data cross-check and information held by them (to this end, please note that the Collection Agents share the same database as the Revenue Agency). In fact, the cross-check usually highlights the amount of the sums owed along with the type of debtor concerned (individual or legal entity) and the assets owned by the debtor (including vehicles, boats, etc.).

For example, the Collection Agents carry out an automatic procedure (i.e. the administrative withholding of recorded movable property) insofar as the amount of the debt is lower than 20,000 EUR and tax debtor owns a vehicle. On the other hand, in the event the amount of the tax debt exceeds the threshold of 20,000 EUR and the tax debtor

owns both real estate and vehicles, the Collection Agents apply a targeted approach. It means they have to analyse in further detail the tax debtor's position in order to single out the most suitable measure instrumental to ensure the recovery of the tax debt.
As mentioned above, the size or amount of the tax debt is considered to be the main feature for segmentation. However, the Collection Agents can take into account also other features such as age of the debt, the category of debtor (individual or legal entity), the assets owned by the taxpayer and the characteristics of the assets (real estate and/or only recorded movable property etc.).

The main threshold in the debt segmentation is about 500,000 EUR. However, in specific cases, should the tax debt amount up to 1 million EUR, a special central unit of the Collection Agent, with a seat in Rome, is in charge of analysing thoroughly the position of the enterprises or other legal entities concerned and investigating whether some of them put in place dedicated operations (such as the division or transfer of a going concern), or carried out sales of any of their goods with a view to fraudulently decreasing their assets so as to cause damage to the creditors etc. In this case, the Collection Agent - by means of its special unit - conducts a tailored action upon them.

The Collection Agents do not classify tax debts according to their age. Nevertheless, they have to take into account the ten-year statute of limitation and conduct actions to interrupt that period.

Once the Collection Agents selected the tax debtor according to the amount of his/her tax debt, they can take into account also other further features as the category of the tax debtor (individual or legal entity), the size of company (i.e. the number of employees), the place where the company has the seat and the type of assets that he/she owns.

6.7.3 Norway

In Norway debts are segmented according to age, value and type (i.e. personal income tax, corporate tax, etc.). Debt types are segmented into size, age, frequency of tax obligation, cause of debt, interest and or fees accrued. New debts have priority, but large debts (new and old) are prioritized as well. Debts are classified according to type and the cause/nature of the debt. Typical reasons for a debt are assessment, lack of filing a tax report, auditing and joint liability.

Classification of the tax debtor in terms of compliance behaviour (filing, payment and response to contact with the tax agency) is carried out in a combination of manual and automatic routines. This allows Norway to prioritize within different collection portfolios as well as prioritize among different attainable measures, and set the timing accordingly.
Non-residents are segmented already from the reporting and filing process point and are followed up by specialized offices. There is also a specialized office which has large businesses as its target group.

6.7.4 Portugal

The Portuguese Tax Administration also uses segmentation regarding the age of the debt. One example is the implementation of campaigns aiming at the most recent debts as well as those at risk of statute of limitation (using mail, reminders and outbound).

In 2012, a law allowed the creation of a central taxation unit. “Unit of Large Taxpayers” is responsible for the integrated management of a certain group of large taxpayers according to their turnover and/or their specific area of business, such as the financial sector. This unit manages and monitors the full extent of these taxpayers, including the management of their debts.

The entire universe of debtors is subject to the same standard model of coercive collection procedures. However, the group of strategic debtors is also subject to more specific treatment.

Likewise, recent debts or at risk of statute of limitation are subject to specific campaigns beyond the conventional/sequential models applicable to all debts, i.e., outbound campaigns informing the advantages of voluntary payment to avoid coercive actions. Tax Administration not only treats and monitors the debt risk of statute of limitation as follows-up the most recent debt (the debtors under coercive procedures set on less than 15/30 days) , through various specific outbound campaigns, pedagogical emails, alerts, reminders, etc.

While there is no formal segmentation based on the behaviour of the debtor, the Portuguese tax administration uses real time information (periodic payment obligations, recent debts) to encourage voluntary compliance of taxpayers / debtors by sending pedagogical emails and alerts about the advantages of compliance against the disadvantages of enforcement acts of debt recovery.

6.7.5 Spain

The Spanish tax administration has no specific treatment related to type of tax debt. They do take in account the tax debtors’ behaviour and apply the following measures:

- Decisions on instalments will be negative for debtors whose previous behaviour exists of non-compliance or will have to be accompanied by a strong guarantee to support any instalment;
- Decisions on initiating a secondary liability procedure against managers or other persons related to the debtor;
- Decisions on precautionary measures can be taken in order to avoid the transfers of assets (which obstructs the payment) if new debt comes up during a tax audit assessment.

In Spain the order to achieve more effectiveness and efficacy in the collection and recovery procedures, for collection management the debtors are classified into five different groups, generally according to the amount of debt (the whole amount of debts of a debtor). This means that the collection procedures used for every group will be different.

- Group 1 » Debts up to 18.000 EUR (notice that this figure is the total amount of the due debts for a debtor and not for each debt), that must also have the following features: not suspended, not guaranteed and not deferment granted. (These features allow carrying out attachments and liens with a low risk of mistake).
- Group 2 » Debts under 150.000 EUR, not included in group 1.
- Group 3 » Debts between 150.000 EUR and 1 million EUR
- Group 4 » Debts over 1 million EUR
- Group 5 » Specialized following treatment debtors (insolvency, large companies, tax fraud criminals) The proceedings that will be employed on every block will be different according to the following scheme: For the first block, totally automatic systems; for the second one, most of the systems are automatic but a few individual actions; for the third and fourth block, individual actions and proceedings, and for the fifth block there are special proceedings according to the nature and circumstances of the debtor.

In addition, the Spanish way of working consists of using an open and flexible IT system that allows to elaborate ad-hoc consults according to the necessities required in a very precise moment, crossing data and information in order to select the group to deal with and once it is selected to employ collection and recovery actions on that group of debtors. To operate as an open system allows incorporating new data or new kinds of data that are supplied. To be flexible allows preparing fixed consults for common situations and specific and individual consults for special situations. This allows establishing specific segmentations of debtors and debts according to special needs at any time. Within this system the most frequently used factor is: the age of the debt.

Its purpose is to select those debts considered old to analyse the situation in order to carry out possible collection actions, decide about writing them off, or analyse the risk of prescription (statute of limitation) to conduct actions to interrupt that period.

As it is has been previously said, although the first and main feature of segmentation is the total amount of debts of the debtor as it is going to influence about the use of automatic or non-automatic procedures and the existence of an individual analysis, the system has a big flexibility, with dozens of features for every debtor that allows to cross information and to determine specific groups or sets of debtors with homogeneous characteristics and therefore with similar recovery proceedings. This flexibility enables to design periodical campaigns according to what the National or Regional Department has planned (for instance, big debts that are almost bound to get to the expiry of the statute of limitation; old debts; debtors with specific assets (bonds, airplanes, yachts).

Size and age can be considered the most important features of segmentation from a massive or general point of view. However, many characteristics can be taken into account, for instance individual or legal person, nature of the assets owned by the debtor. Besides, if the debt comes from the liabilities originated in a tax fraud crime, the special procedure required determines a special treatment of those debts. Therefore the debt is included in the system with a special code that enables its specific management.

The segmentation makes a decision possible on the inclusion of the debts and debtors in automatic or non-automatic procedures. Furthermore to design general or specific campaigns at national or regional level, determine different groups or sets of debtors with similar or homogeneous features so as to use homogeneous procedures on them in the next step. The segmentation is part of the risk analysis allowing to cross massive information and to decide on functions and proceedings. Even within the collection teams and groups, the heads of the team can design specific tasks and functions based on segmentation of their own debtors. It also enables to control the actions by the heads of different levels and to elaborate the statistics and to analyse them.

6.8 Summary

As stated above the risk analysis process is a dynamic and structured one that is repeated and consists of defined steps to support improved decision-making. It allows us to better measure the quality of each of the individual stages of the decision-making process as well as assists us to detect mistakes in an earlier stage.

In this report the risk analysis process has been identified and focused upon in five different steps. The different steps are depending on each other to get the best possible outcome of the risk analysis. The most important steps in the process are:

- Risk identification (getting a clear understanding of the risks involved)
- Categorisation and analysis of risk indicators (grouping associated risks)
- Prioritisation of risk indicators (deciding on which risks are the most significant)
- Selection (select results for lists of targets for collection/recovery procedure)
- Evaluation of the whole process.

If the data as the result of the risk analysis process is not sufficient, accurate or adopted according to the risk in the risk management process, there is no point having a sophisticated and advanced IT-support for data mining. The success of the IT-support and data mining is depending on the quality of the data that is extracted from the risk analysis process.

It is clear from the answers of the surveyed countries that they use different steps in the process and these steps differ a lot from country to country. Some countries use a more modest segmentation and other countries are using a more complicated risk analysis process including for example data mining (see chapter 9).

Whatever method is used, all tax administrations benefit from some form of risk analysis in their debt management. Most IOTA members stated they particularly use risk analysis in the stage of enforcement, especially when making instalment arrangements or deciding on starting a bankruptcy proceeding.

7 Organisational solutions of risk analysis for debt management

7.1 Introduction

The organisational structure is important to successfully manage debt collection and recovery. Tax administration's structure is usually aligned to its mission statement and treatment strategies so that the organisation can operate effectively and efficiently. It is also important to make sure that staff levels, their competences as well as learning and development are adjusted to strategic management choices regarding risk analysis.

As a consequence of a risk based approach to tax debt management, human and other resources will be allocated to the areas where the risk of defaulting in tax payment is the highest. The organisational structure should be designed in a way to support tax administration in successfully handling risk analysis for tax debt management. Tax administration may decide whether to establish a dedicated unit (centralised or decentralized) responsible for managing risks related to the collection and recovery of tax debts or have a risk analysis function integrated and spread at different levels of the organization along with relevant stages of the tax collection process.

7.2 A dedicated unit

It is possible to have a dedicated unit in charge of the risk analysis.

- Sweden and Belgium have dedicated unit at the central office.
- Italy and Azerbaijan have a dedicated unit at the central and regional office.

Tax administration of *Sweden* has a special unit located within the organizational structure of Headquarters which deals with risk analysis. Analysts from central and local level operate in this unit and evaluate risks of different taxpayer segments.

Also the risk analysis unit in *Belgium* is responsible for data analysis (including the data mining) which is carried out by a team of analysts/data miners at the central offices in Brussels. This is done at the second stage of the risk management process which includes the choice of the most appropriate recovery action, the elaboration of working instruction and to collect feedback information.

The tax administration of *Azerbaijan* has a Tax Debt Management Division which ranks the debts on the estimated risks in order to manage effectively and efficiently action plans tax offices located on the territory. It is analysed at Division of Tax Debt Management Department of the Ministry of Taxes. Also all Regional Tax Departments have got its own analytical section under Tax Debt Management division. They evaluate debts through risk indicators and classify them. It enables tax officers to manage debt faster and cheaper.

As for *Italy*, there is a special unit that provides a guide to the peripheral units located on the national territory to recovery tax revenues and to mitigate evasion.

7.3 Other structures

7.3.1 Several units at central office

Bulgaria, Denmark, Estonia, Latvia, Malta, Norway, Slovakia, Switzerland, the United Kingdom have a co-operation between several units at the central office.

In *Estonia* the criteria are set in co-operation between two units: the revenue department (which deals with recovery) and the intelligence department, which runs the model that determines the risk levels. Based on the criteria that have been agreed on, the model calculates the risk level for legal entities.

In *Latvia* the risk analysis in the area of tax debt management is done by the respective tax inspector under whose competence is the taxpayer. The tax inspector manually summarises the information on tax debtors available at IT systems of the tax administration and in external IT systems. Also the tax inspector from the Recovery Management and Support unit at the SRS Tax Debt Recovery Department takes part in the risk analysis process.

In *Malta* this function is conducted jointly by the Collections Section and the IT Section.
In *Slovakia* risk management in debt management is not organized in the administration. It is managed by various departments of Financial Directorate of the Slovakia Republic (tax enforcement department, tax administration department, tax methodology department, etc.).

In case of *United Kingdom*, there are two main areas, Analytics and Campaigns. They are located within Debt Management and Banking, which is part of Enforcement and Compliance in HMRC. Their role is emerging as the teams develop further with the increasing analytical capability. Campaigns drive the Analytics as Campaigns are responsible for defining the business requirement. The Campaign Team designs the process. These two areas work very closely together, with specific work discussed and agreed at Campaign Operating Group. Both of these areas are within Debt Management under the same Director.

In *Switzerland* there are two units (recovery unit and risk analysis unit) that interact together to implement strategies to maximize the taxes collection.

In *Bulgaria* the Directorate "Collection", department "Debt Management" is responsible for risk analysis.

7.3.2 Officials at the local tax office

In Austria the responsibility of tax officials is at the local tax office. The strategy and the targets are decided by the leading unit in the Ministry of Finance. The risk management concerning single cases is in the responsibility of the local tax office and the officials in the competent unit.

7.3.3 Units from central and local office

In Ireland, the Netherlands, France and Spain is the risk analysis conducted jointly by several units from central and local office.

In *Ireland* the tax Collection is centralised and within the Tax administration. There is a Division referred to as the Collector General`s Division that has responsibility for the collection of Tax debts in Ireland.

The Netherlands are still in the process of developing a policy. Several possible strategies are tried out "pilot-wise". Some are done at a National level, some at a Regional / Local level.

In *France* the tax administration has structure and organization in different levels:

- Large Taxpayer Unit (1 Directorate in Paris for all France)
- Medium and small business: 750 local services in charge of business tax only
- Individual: 750 local services in charge of income tax and local tax only
- 100 PRS (one/Directorate in France): in charge only of audit tax or/and enforcement of important income tax)

In *Spain* there is no specific unit involved in risk analysis, although the National Collection Department is responsible to coordinate all the information received, to evaluate them, to design new methods, structures, procedures and systems, and to coordinate its employment in the design of the new IT systems in coordination with the IT Department of the Spanish Tax Agency. The main interaction is with the IT Department in order to explain to it the necessities and to cooperate in the design of the software to use in the risk analysis and the employment of that software.

7.4 The staff levels, development of knowledge and skills

In *Sweden* there are 60-70 employees in total in the Risk analysis Unit, 23 of them are working in PRIUS.

Sweden has established regular meetings between the Structure Department which deals with the analysis of risk and the Legal Department which also defines the rules for use and treatment of different types of information. The competence of the staff is in statistical, IT, investigational, analysis etc. The training is in the different software tools used by the tax agency. There are workshops and regular seminars for analysts, exchanging information and knowledge. There are also general courses in econometrics, statistics etc. There are in house courses as well to gain knowledge on operations of certain areas (getting to know the work within debt management is good for analysts).

The administration of *Belgium* has a unit on a central level of the organisation: permanent communication is organised between risk analysis coordinators and other units (legal

department, privacy working group, etc.) The implementation of the risk management process takes place in the operational units, being the tax offices for VAT and direct taxes.

Central Office for Perception and Recovery → Unit of Applications and Business Analysis which is divided into 4 Divisions:

- Data Division (10 persons)
  Data Division is divided into Reporting Team and Big Data Team.
  Big data Team is in charge of development of data mining tools.
- Applications Division
- Test and Support Division
- Business Analysis Division (6 persons).

The competences are within risk analysis in the field of:

- Coordination (business knowledge)
- Analysis (including data mining).

Belgium organises professional development for the use of the SAS technology.

In *Azerbaijan* there are 5 tax officers at the Division under the Tax Ministry. Also the same structure is functioned at each Regional Tax Department. Number of employee is 4-8 according to the size and number of the tax payers registered in these Departments.

The evaluation of debt features is done according to the data mining and creates a lists of debtors on which relevant measurements are considered to be applied in the priority order. The development of the staff is done within the:

- Recovery process of those debtors who have no property and/or asset
- Debt recovery process by directed debt to the third party property.

In *Switzerland* there are 3 lawyers and 30 recovery experts working in recovery. In the area of risk analysis there are 4 employees. Their expertise is mathematics & economy.

In *The United Kingdom* there are approximately 10 experts working in analytics and 30 in Campaigns. Their expertise is in the field of analytical capability, calculation, decision-making, technical knowledge for tax and IT.

7.5 Summary

Sufficient level of staff operating within the risk analysis unit and development of their knowledge and skills are important to consider in paving the way which tax administration has to follow in order to effectively and efficiently use risk analysis within tax debt management area.

Information collected during the survey suggest that organization of risk analysis function varies from country to country, particularly with regard to having a unit dedicated to specific responsibility of risk analysis for tax debt management.

It is also worth mentioning that functions associated to risk analysis or debt management are undertaken by a specific unit within central office of tax administrations in *Belgium* and *Sweden*.

In the case of *Ireland, the Netherlands* and *Spain,* both central and regional structures manage tax debt risks as well as select specific debts, debtors or cases based on the risk with support of computer systems.

It should be noted that specific units of *Belgium*, *Azerbaijan, Switzerland and United Kingdom* perform risk analysis with a small number of employees (< 10) but with special skills of coordination and risk analysis techniques and data extraction (data mining), organizing (*Belgium, Azerbaijan*) about training and professional development.

Sweden and *Italy* are using a larger number of employees who, with more generic skills, are dealing with investigative activities and risk assessment in relation to non-payment of taxes, causing subsequent appropriate recovery actions to be implemented. It is similar as well among others, that their training activity involves the use of information technology, econometrics and statistics, regulatory and procedural updates on tax debt management.
In order to interactivity of the risk analysis unit with other business units, e.g. Legal Department, there is no special disposition or rule with regards to privacy of information issues/data access, or other services.

There are also several countries (*Denmark, Estonia, Latvia, Malta, Norway, Slovakia*) where the tax debt risk levels are determined jointly by structural units at the central level of tax administration (e.g. collections and IT, debt recovery and intelligence, etc.) based on the agreed criteria.

8 IT Systems support in risk analysis for debt management purposes

8.1 Introduction

The implementation of a methodology regarding risk analysis in debt management requires without any doubt the use of efficient IT systems and their use is necessary in different phases of a risk management process.

This chapter will focus on how IT-solutions can be used in the following stages of risk analysis process:

- In the phase during which the data used for risk analysis are collected, explored and prepared
- In the phase during which the result of the risk analysis process must be implemented in the operational units of the organisation.

This Chapter will also briefly highlight the possible use of a data warehouse solution by tax administrations.

8.2 What to do with data?

8.2.1 Collecting, exploring and preparing data

Chapter 7 of the report describes the ways of identifying risks by using a range of data and data manipulation techniques supported by analytical tools and indicators in order to identify risks and evaluate their significance. It is also mentioned that risk identification can be successful by a balanced and combined use of relevant data.

Chapter 8 of this report presents the second step of the risk analysis process, being the analysis phase during which the identified risk indicators can be categorised and weighted in order to select or to score cases within the debt management activities.

It is obvious that all above described actions can only be carried out with the support of IT solutions. The choice of a convenient IT solution, such as for instance the SAS tools, Oracle, Cognos, Java or a simple Excel or Access database, depends on the nature of the risk analysis methodology which will be used by the tax administration in order to analyse indicators identified in the first (risk identification) and second (risk prioritisation) step of the risk analysis process. This risk analysis methodology could be developed from a simple selection of taxpayers and their various data up until the use of more advanced modelling techniques of data mining.

Particularly the methodology of a data mining model requires sufficient computing power and database resources to support the analysis of the most detailed level of taxpayer transactions. It includes software for manipulating all that data and creating models. And, of course, it includes a rich collection of data mining software.

It is not reasonable to compare the merits of particular IT products here although the criteria for their evaluation could be: price, availability, support, relationship with IT company/vendor, compatibility, and ease of integration into the selection risk analysis process. So, tax administration can easily choose from a wide selection of IT solutions to find that particular vendor that meet best their needs and requirements.

The IT systems that are currently used by tax administrations for debt management can be divided into two categories:

- Commercial software and applications
- Free open-source software and applications.

8.2.2 Communicating the results of the risk analysis process

All results from using risk analysis methodology in debt management must of course be made available to the operational debt collection and recovery units within the tax administration which can be considered as “end-users”.

Results can be communicated to these end-users by means of a list containing pre-selected cases which are the result of a selection operated in an individual risk analysis exercise or of a scoring process using data mining methodology.

Choosing the most efficient way to communicate these results will in fact also implicate the use of an IT system which could be a “stand alone“ system developed specifically for debt management or an integrated system utilised by the entire tax administration.

8.2.3 The use of a data warehouse environment as part of an IT solution

Tax administrations can make the strategic decision to invest in data warehouse which would serve as a specific solution for collecting large amounts of data used for risk analysis. A data warehouse environment can in fact be a solution for dealing with a complex variety of different data sources which can be stored permanently in the data warehouse environment using an ETL technique. ETL stands for **E**xtract (from different internal or external databases) **T**ransform (the different data) and **L**oad in the data warehouse environment.

The possible advantages for using a data warehouse environment could be resumed as followed:

- The process of extracting and transforming is automated and data is stored in a non-volatile way which allows analysis over time.
- The data is optimally organized for the analysis process because they are translated in the same structure.
- The data are highly secured (protection of identification data).
- The data is stored on a permanent basis.
- The data is of a high quality: they are validated according to predefined business rules before the loading process in the data warehouse environment.
- Possibility to use historical data in the analysis process.

8.3 IT systems used by IOTA members

IOTA member countries were asked a wide range of questions regarding IT support e.g. whether they use a dedicated IT system in the field of risk analysis for tax debt management or not.

Overall, the answers to the survey indicate that there is a diverse range of application software solutions already in use or to be used in a near future by tax administrations. The most commonly used software is SAS, Oracle, Java and Cognos.

Austria has an IT solution supporting 3 separate areas (operational system, reporting system and a flat file system) where tax officers manage tax debt cases and where they are able to use the risk indicators for searching the risk cases.

Belgium uses the SAS technology (e-guide and e-miner) for basic risk analysis procedures (elaboration of selection lists based on a number of risk indicators) as well as for predictive modelling.

Sweden uses an IT solution for purposes of risk analysis and case selection. The IT tool connects to a data warehouse environment and an in-house solution is used for scheduling and meta data handling.

Spain uses an IT tool to classify the risks into categories, i.e. high, medium and low.

Switzerland uses an in-house developed IT risk analysis platform in a data warehouse environment, data mining software and a reporting tool.

Tax administrations in the *United Kingdom* and *Estonia* use a SAS technology based IT solutions to gather necessary information about main tax debtors. The information is passed to tax officials by means of a reporting environment.

Azerbaijan, Italy, Republic of Srpska and *Slovakia* do not use a dedicated IT system supporting risk analysis for debt management.

Consequently, tax administrations implement the results of risk analysis into specific end-user applications. *Belgium* uses a specific end-user application which is part of a larger case selection tool that has been developed by the tax administration. The application also allows end-users to make customised selections, and it also has reporting capabilities.

Sweden uses a specific end-user application in a separate system which is developed by the tax administration. The results of case selections are sent to different case workers. The application has no specific reporting capabilities but information is transferred from the application into the data warehouse to create feedback reports.

Denmark uses a specific end-user application, though the risk analysis component is not fully implemented. The scoring function is used for segmentation of taxpayers and end-users are provided with the cases pre-selected as a result of scoring. The application is also

developed in-house for debt management but the credit scoring model is created in corporation with an external private company. The reporting functionality of this application is subject to future development.

Ireland uses an IT-system called Integrated Business Intelligence System (IBI). This system provides access to all sources of information that are available within the tax administration. The information from all of the interactions that the tax administration has with its case base is gathered and can be interrogated by the IBI system to give a more detailed understanding of a particular case under review. This is very helpful when deciding on what the appropriate collection strategy is to be implemented so as to affect recovery. The results help to decide on a course of action that can be implemented when choosing a recovery method, or if there is a requirement to investigate the ability of a business to make payments by instalment, or if a case is under review for the purpose of whether or not to conduct a revenue audit.

Spain has mostly online information systems each having its own integrated database. By connecting the information regarding the tax debtor with the online sources, all the information is supplied. The results are used depending on the actions or decisions to be taken.

Norway uses a system called SOFIE for classification of the tax debtor in terms of compliance behaviour (filing, payment and response to contact with the tax agency). Debts are classified according to type and the cause/nature of the debt is noted in a system. All new and large debts are high priority, regardless of type. The system SOFIE gives Norwegian tax administration the possibility to segment debt in many different ways through generated standard reports as well as debt reports customized by the IT Department. The system has Debtor Adjusted Collection functionality which is only used on debtors residing permanently in Norway. Debtor Adjusted Collection is a strategic management tool which supports efficient tax collection in terms of resource allocation, the achieved results, and in terms of monitoring.

Since 2010 the *Portuguese* tax administration has been implementing a system called "SIGIDE" which carries out debtor's segmentation based on the full amount of the debt. It is not a universal segmentation but limited to a group of debtors - strategic debtors, which are selected according to the following criteria:

- Aggregated debt in a regional office's area, amount exceeding 500,000 EUR, or
- Aggregated debt in more than a regional office's area exceeding 250,000 EUR, or
- Not included in the above, whose debt represents 80 % of the debt portfolio dealt by the regional office.

The "SIGIDE" or "MSD" (System of Integrated Management of Strategic Debtors – English acronym) is an IT system that enables integrated management of large debtors, that is used to collect all information (past and present) of the debtor, which then serves as the basis for developing a strategy to recover the debt. The system provided in a single view all the recorded data about the debtor, i.e. customers, suppliers, assets, debts, auditing

procedures, administrative and judicial litigation, as well as relationships with other taxpayers and the identification of managers when the debtor is a business company.

Each strategic debtor has an assigned strategic debtor manager (at regional office level) whose mission is to develop a plan of actions for debt recovery. Based on the information collected about the debtor's customers, suppliers, assets, tax auditing, legal proceedings, among others, the IT system SIGIDE makes a diagnosis which allows the case manager to make a specific plan of debt recovery.

A team of experts located in a central department of the tax administration gives support to regional services and monitors the implementation of the plan of actions set to collect the debt from the strategic debtors. Moreover, monthly statistical newsletters are released to local and regional tax offices, with quantitative data gathered from SIGIDE that illustrates in a graphical form and per regional office the performance of this strategy and is also useful as a management support tool.

8.4 Summary

It is obvious that debt enforcement procedures and activities will be based more and more on risk analysis in order to allow management of the tax administration to define the most efficient strategy. The organisation of debt management today is under tremendous pressure to succeed in a difficult economic and budgetary situation. The risk analysis process requires a certain interaction with the IT-department.

There is a high demand for modern IT solutions to provide further support for debt management during all phases of the risk analysis process. The majority of IOTA members have implemented or are in the middle of developing IT solutions in their debt enforcements units.

9 Use of data mining

9.1 Introduction

Data mining is currently becoming an increasingly important research field, though a large gap still remains between the research and practical application of data mining for tax debt management. The methods of this new technology have quickly become widespread, with application areas ranging from credit risk, marketing, or fraud detection to counter-terrorism. In all of these, data mining is increasingly forming a key part in the decision making process. Data mining can support the tax administrations in achievement of strategic outcomes where taxpayers meet their obligations and revenue collection is secured by having an intelligence-based risk assessment along with the development of effective measures influencing tax payment behaviour. Hence, data mining is a hot topic and is slowly finding its way into tax debt management strategies.

As it was already mentioned in section 10 of this report, data and information are critical to the operation of any tax administration. Understanding and making use of this data is both a challenge and an opportunity. It is neither possible nor efficient for any tax administration to handle large quantity of data manually or by basic query tools. Analytics, and data mining as such, is the discipline of using statistics in combination with computer programming to gain insights contained in large quantities of data and undertake actions based on those insights.

Data mining in tax debt management therefore can be defined as: exploration of data with a view to discovering meaningful new relationships, patterns and trends in tax debtors' behaviour using pattern recognition technologies as well as statistical and mathematical techniques, which would support the improvement of business processes and the optimisation of tax debt management.

This section will focus on principles and benefits of using data mining in the risk analysis within the debt management process. Although data mining and tax debt management have found each other only recently, and most IOTA members are still in process of discovery or testing, much can be said about the advantages using data mining for risk analysis. Once taxpayers have failed to comply with their payment obligations, data mining can aid tax administration in debt collections. Models are used to forecast the amount of debt that can be collected and, in some cases, to assist in choosing the appropriate debt recovery strategy.

9.2 A short introduction to data mining

The objective of data mining is to extract valuable information from data. Modest adjustments in tax debt management strategy, made as a result of a data mining model, can make a difference of millions of Euros in revenue yield and may offer better scientific based decisions. The ultimate objective of data mining is gathering intelligence and the data mining methodology is a technique to extract predictive information from databases. For the purposes of this report, it is assumed that the goal of data mining is to allow a tax

administration to improve its debt recovery and collection operations through a better understanding of tax debtors and their behaviour.

Data mining methodology is widely applied for building models. A model is simply an algorithm or set of rules that connects a collection of inputs (often in the form of the fields of the tax administration's databases) to a particular target or outcome. Regression, neural networks, decision trees and other data mining techniques are applied for creating models. Under the right circumstances, a model can result in an insight by providing explanation of how outcomes of particular interest, e.g. insolvency/bankruptcy or failing to pay a debt, are related to and predicted by the available facts. Models are also used to produce scores. A score is a way of expressing the findings of a model in a single number. Scores can be used to draw up a list of debtors from most to least likely to default or most to least likely to pay.

Although data mining (analytics) is a young and modern development, 13 of the 21 surveyed IOTA member tax administrations are already using it in some way or the other within the tax debt management area. This can surely be explained by the added value that data mining may have for risk analysis as well as for entire debt management process. Most of the responded IOTA members have started using data mining for tax debt management rather recently. It is clear from the below list that most tax administrations are still in the process of either discovering data mining or early development or testing:

- Up to 5 years: Belgium, Estonia, Denmark, Ireland, Italy, Sweden, Switzerland, United Kingdom
- 6 to 10 years: Azerbaijan, Norway
- Over 10 years: Spain.

Data mining can be supervised and unsupervised. Supervised data mining attempts to explain or categorize some particular target field such as payment or bankruptcy. Unsupervised data mining attempts to find patterns or similarities among groups of debtors without the use of a particular target field or collection of predefined classes often used in the area of combat against fiscal fraud). Classification, estimation and prediction are all examples of supervised data mining, where the goal is to find the value of a particular target variable.

9.3 Main functionalities of data mining

Data mining can be used to perform the following tasks[15]:

- Classification and estimation
- Prediction
- Association rules
- Cluster analysis/segmentation
- Network Analysis
- Text mining

[15] Berry, M.J.A., Linoff, G.S.,"Data Mining Techniques. For Marketing, Sales, and Customer Relationship Management", 2004, Wiley Publishing, Indianapolis, Indiana, pp. 8-12.

9.3.1 Classification and estimation

Classification consists of examining the features of a newly identified taxpayer/debtor and assigning it to one of a predefined set of classes. The classification task is characterised by a clear definition of the classes, and it offers a training set which consists of pre-classified examples. The task is to build a model of some kind that can be applied to unclassified data in order to classify it. Classification deals with discrete outcomes: yes or no. For example: applicants for a debt payment arrangement by instalments can be classified as low, medium or high risk.

Estimation deals with continuously valued outcomes. Given some input data, estimation comes up with a value for some unknown variable such as income. Regression models and neural networks are well equipped for conducting the estimation tasks. Survival analysis is commonly used when the task is to estimate the time of an event, for example estimating at what time (= when) a company might become bankrupt.

9.3.2 Prediction

Prediction is similar to classification or estimation, except that the records are classified according to some predicted future behaviour or estimated future value, whereas classification and estimation is looking at current behaviour/values. Prediction is carried out by using training examples, where the value of the variable to be predicted is already known, along with historical data for those examples. The historical data is used to build a model that explains the current observed behaviour. When this model is applied to current inputs, the result is prediction of a future behaviour. The data will take the form of a set of examples, for instance examples of tax debtors or situations in which certain debt recovery procedures have been used. The output takes the form of predictions about new tax debtor - a prediction of whether a particular taxpayer will pay the debt or a prediction of what kind of enforcement action will be most successful under given circumstances. Here are some examples of prediction:

- Predicting which debtors will go bankrupt in the next 12 months
- Predicting which debtors will pay or how much they will pay when a certain recovery measure (a reminder, a telephone call, etc.) is initiated
- Predicting the capacity to pay a tax debt.

A particular type of predictive modelling which can be useful for tax debt management is response modelling[16]. Direct and automated reminders issued with the use conventional predictive models target all taxpayers who are defaulting. This approach is not cost effective as it targets all the defaulted taxpayers who will pay their debt, regardless of the reminder. Response models however use a pair of treatment and control datasets. These models identify taxpayers who are likely to pay when receiving reminders but are not likely to pay if they didn't receive a reminder. Response modelling is widely used in the field of marketing, but the benefits of applying it for tax debt management are obvious.

Classification and prediction are the most common techniques which are used for tax debt management and perhaps the most straightforward data mining tasks. Predictive models exploit patterns found in historical and transactional data to identify risks and opportunities

[16] Lee, T., Zhang, R., Meng, X., Ryan, L., "Incremental Response Modeling Using SAS Enterprise Miner", SAS Global Forum 2013, paper. 096-2013.

and eventually lead to a better understanding of taxpayers' behaviour. Classification consists of examining the features of a taxpayer/debtor and assigning it to one of a predefined set of two classes or outcomes (example: "payment" or "non-payment"). The advantage of this technique is that every tax administration, every country, can easily adapt the predefined set of outcomes to their own liking and specific ways of working and legislation.

9.3.3 Association rules

The task of association rules is to determine commonalities. Association rules are a simple approach to generating rules from data. For example: if two types of tax debts occur together frequently enough, the data mining model can generate association rules or generalised example, i.e. companies which don't pay corporate income tax, also don't pay VAT.

9.3.4 Cluster analysis/segmentation

Clustering is the task of segmenting a heterogeneous population into a number of more homogeneous subgroups (also called "clusters"). The records are grouped together on the basis of self-similarity or unique features. It is up to the user to determine what meaning, if any, to attach to the resulting clusters. For example: clusters of taxpayer attributes might indicate specific clusters of debtor segments.

9.3.5 Network analysis (= social network analysis)

Network analysis can help tax administrations detect and prevent fraud or non-compliance by going beyond individual views to analyse all related activities and relationships at a network dimension.

9.3.6 Text mining

Text mining refers to the analytics of deriving information from text. With text mining tasks like text categorisation, sentiment analysis and document summarisation are possible. As taxpayers and debtors are continuously communicating with tax administrations, text mining can help to better process this mass of information and to better understand taxpayers' behaviours.

9.4 The data mining environment

Having knowledge of many algorithms used for data analysis and modelling is not sufficient in conducting a successful data mining project. It is critical that the rollout process for these models follow a standardised approach in order to ensure that each model is developed, evaluated and implemented in the same way and therefore raises no questions as to its reliability. This process or methodology is necessary to transform data into consistent information and to avoid the undesirable outcome of learning things that aren't true or learning things that are true, but not useful. Learning things that aren't true is more dangerous than learning things that are useless because important business decisions may be based on incorrect information.

The methodology used in this regard by Belgium and Sweden is the Cross-Industry Standard Process for Data Mining (CRISP-DM). In short, the process could be defined as follows[17]:

- Business Understanding: problem definition and preliminary plan
- Data Understanding: initial data collection and understanding
- Data Preparation: transformation and data cleansing
- Modelling: selecting the modelling technique, building and assessing the model
- Evaluation: interpretation of the model
- Deployment: determine how the results need to be utilized, who needs them, how often.

Another popular data mining process methodology is KDD (= Knowledge Discovery in Databases) but none of the surveyed IOTA members confirmed using this[18].

"How much data do I need for data mining?" This is one of the most frequently asked questions about data mining (next to "What is data mining?"). It makes sense that this is a concern – data is the raw material, the primary resource, for any data mining endeavour. The question of how much data needed for data mining is difficult to answer. Look for two key attributes of classification models: accuracy and reliability. Accuracy is a measure of how often the model gets its predictions correctly. Reliability is a measure of how consistent the model is with different data sets. A model that has high accuracy on one data set but lousy accuracy on others is not much of a use. Therefore good data mining practice, for the most common used data mining methods classification/prediction, requires splitting any data table into at least two segments. One segment is used to build, or "train", the model. The other is a testing, or "hold out" segment that is used to validate the built model – checking the model's performance and robustness on unseen or new data. So, data mining is more than running some data through a classification algorithm. These algorithms produce models that will vary in quality. In the absence of data for a certain data mining model, the results of the "training" and testing" sets will be different.

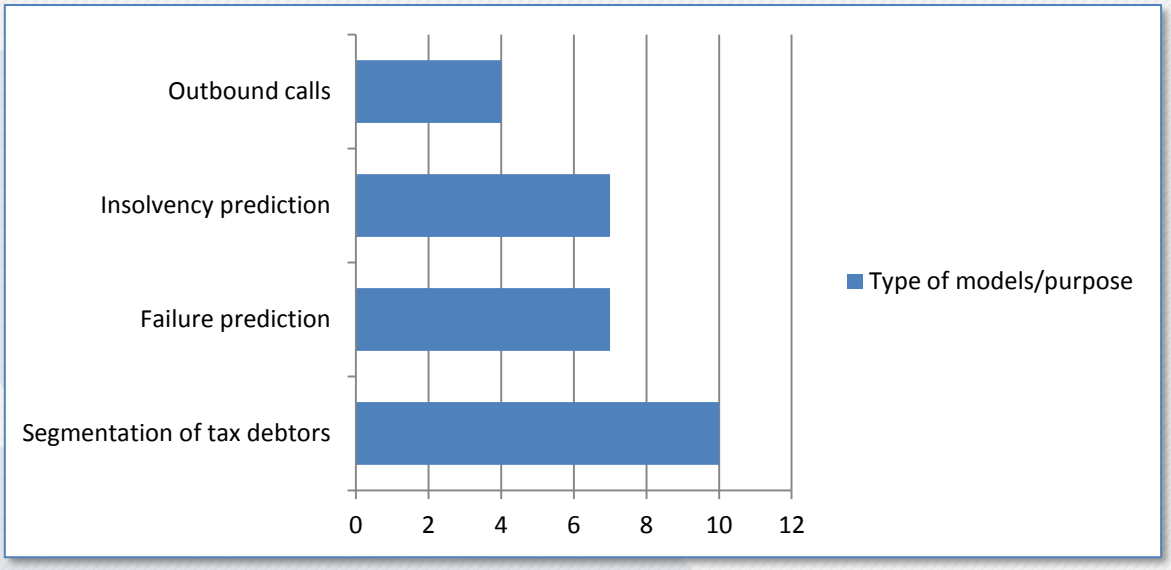
9.5 Use of data mining in debt management

Sometimes the purpose of data mining is simply to describe what is going on in a complicated database in a way that increases our understanding of the debtors, non-compliers. A good enough description of a behaviour or segment will often suggest an explanation for it as well.

Apparently, when looking at the graph below, the segmentation task of tax debtors is the most important motivation to use data mining. According to the graph 10 members of IOTA indicated the segmentation of tax debtors as one of the types of models which has been implemented by their administration.
Taxpayer segmentation is not a new concept, but segmentation can deliver immense possibilities to the collections process when combined with innovative methodologies such

[17] ftp://ftp.software.ibm.com/software/analytics/spss/support/Modeler/Documentation/14/UserManual/CRISP-DM.pdf
[18] A good description of several data mining processing models can be found in:
Cios, K.J., Pedrycz, W., Swiniarski, W., Kurgan, L.A., "Data Mining. A Knowledge Discovery Approach", 2007, Springer, pp. 9-23.

as predictive modelling. Such tools can help to make further refinements in debt collection strategy while also providing valuable information on the changes in taxpayer interactions with tax administration. The real added value of debt scoring is to determine the most optimal options of debt recovery practice. Generally, the process of collecting taxes and recovering them after default consists of a sequence of measures such as written reminders, telephone calls, bailiffs, contacting third parties, payment arrangements, etc. Scoring models can help to make decisions as to when relevant action should be taken towards the accounts of tax debtors and which of several alternative collection measures might be more appropriate and successful.



An example of this is given by *Denmark* where the Danish Customs and Tax Administration has developed a process of tax debtor segmentation (companies, sole proprieties, persons) and credit scoring (propensity to pay "up front"). Debtors are grouped into high, medium and low risk classes. This risk grouping determines collection strategy: bailiff when high risk, phone call when medium risk, automatic letter when low risk. The Danish tax authorities treat low-risk debtors differently from high-risk customers by being more patient with their delinquency and employing soft methods of persuading them to pay. So the Danish Customs and Tax Administration is trying to improve its debt collection by using risk information to guide collection actions and priorities. Careful segmentation of debtors definitely allows more targeted pursuit. Some taxpayers may just need a text message reminder to pay a fiscal debt. Others will need a more active approach. Data mining allows this fit-for-purpose approach. With this in mind, tax administration can better align debt collection strategies to specific profiles where applicable.

Insolvency/failure prediction is another popular topic for the use of data mining in tax debt management. The importance of the area is due in part to the relevance for tax administrations in evaluating the likelihood that a company may become bankrupt. Once a company is declared bankrupt, chances of recovery of tax debts are close to zero. So, predicting and anticipating this event will benefit all tax administrations. The identification of problems before the default occurs increases the ability to fast(er) implement highly targeted intervention strategies. Of course, uneconomically collectible debts that accumulated over a long period of time are eventually written off. With early warning from

a predictive model, the tax administration can undertake relevant actions in the recovery process. Once predictive models are developed, tax administrations might recognise the phenomenon that leads businesses to bankruptcy and better understand the factors that dictate insolvency/failure in order to minimise their exposure to high-risk taxpayers.

A traditional method of contacting a taxpayer for the purpose of putting in place a payment arrangement has been an outbound phone call. Given that customer selection is largely random and that the human resources of the debt recovery teams are limited, this procedure is considered to be highly inefficient. To improve this process, data mining models have been built by *Azerbaijan, Sweden, Switzerland* and *Belgium* to model debt recovery and predict the response of debtors if contacted by phone. The results from ranking and selecting debtors based on predicted scores assist the tax administration's resource-limited debt recovery teams. For example in *Estonia*, the decrease in the amount of tax debtors and tax debt is one of the results that are expected from data mining.

In *Spain* data mining is used to classify tax debtors according to their features and to apply specific measures or procedures for each group. It is also used to make individual analysis of the situation of every debtor. In this case Spain is using data mining to manage tax debt with response that fits best the purpose.

Belgium will use data mining to identify debts where the pursuit of the debt is uneconomical and to identify the self-finalising segment (= debtors who will finalise their debt on their own). Predictive modelling is also used to classify and profile debtors in an objective way according to their solvency risk (= capacity to pay) and payment behaviour (= propensity to pay). So, the analysis unveils which taxpayers can't or won't pay, and avoids alienating loyal taxpayers. This also helps to identify risk profiles and behaviour of taxpayers in order to establish efficient working methods for the tax collection offices. This allows creating client-scoring solutions to assist the decision-process what actions to take in which debtor segments, at what intervals and in what sequences. So tax administration in Belgium predicts taxpayers' payment abilities and tailors interventions to optimise collections by building risk scores for all taxpayers based on credit ratings, behavioural patterns and payment history.

The advantage of predictive analytics is that tax administrations can very precisely segment their taxpayer base for collection risk and manage that risk without making a negative impact on the experience of compliant taxpayers.

9.6 Summary

Some of the advantages of using data mining in debt management are mentioned in the previous section. Data mining/analytics can be used to predict and analyse areas of risk and emerging patterns in taxpayer's behaviour. In this matter, data mining uses historical and current data to predict future debtors' events and behaviour. This allows tax administrations to better identify risks, profile taxpayer behaviour, supports decision making and ultimately reduce debt.

9.6.1 Objective weighing of risk indicators

Data mining can also be used to categorise risk indicators and determine the most important ones by applying supervised techniques. All countries that are using predictive modelling and the algorithms in data mining can benefit from the system as it automatically ranks and clusters the risk indicators.

9.6.2 Better decision making

It is important that debt is recovered as early as possible and in the most effective way. Making the right decision is therefore very important. Data mining can provide sufficient insight into taxpayers' behaviour to make such decisions. It uses historical and current data in combination with results established in the course of debt recovery actions to predict objectively probable outcomes of future cases.

Data mining allows the prediction of payment behaviour of potential debtors in order to identify the likelihood of future default. Therefore data mining can be used to find underlying patterns in data to be able to intervene earlier to prevent or minimize debt. In addition, data mining assists in the identification and application of the most effective and responsive debt management strategies aimed at reducing the level of debts. The selection of optimal approach will minimize the cost of administering collections or will maximize the amount recovered from a defaulter. Data mining therefore supports decision making and reduces possibilities for any bias or errors. It enables tax administrations to determine the most cost effective way to reclaim money and as such minimize cost, time and human resources.

10 Country examples of risk analysis in tax debt management

10.1 Introduction

This chapter provides examples of good practises on current approach or working methods of using risk analysis in tax debt management. The countries that have provided examples of their Risk Analysis in Debt Management are: Sweden, Denmark, Norway and Belgium.

10.2 Sweden

Risk Management

The Tax Administration Risk Management Process

Understanding the target

The identification is based on the target, so understanding the target is the first step. It's about defining the objectives covered by risk management. The identification of risks can also lead to change of the target or creation of new targets.

Identifying the risks

The first question must always be "what are the risks?". It is important to always focus on the target and ask yourself "what's stopping us from reaching the target?". Risks are the barriers that impede the achievement of the target. Risks can be identified in both the short and long term.

Analyse risks

Once risks are identified, they are analysed. The analysis aims to provide sufficient knowledge so that risks can be assessed and action can be prioritized. The analysis will highlight the following:

- Probability or frequency
- Damage
- Trend
- Causes
- Possible actions
- Cost and effect of the measures

Evaluate and prioritize

The basis of the evaluation and prioritization is that the supporting analysis leads to the above described principles. The ability to evaluate and prioritize is the very purpose of making the analysis. It is only when you have the whole picture of the risks and possible actions that it is possible to evaluate which options are the best. An operational planning to see which activities should be implemented next year will be developed.

Perform and evaluate

Planned activities are implemented and evaluated.

Data mining

Assess suitable method for selection

In the selection process, *Sweden* uses rules for selection, models based on scoring risk indicators that are produced in consultation with operational business and models based on data mining.

Sweden tries to create data mining models where conditions are good. There should be an appropriate risk area and enough historical observations are needed to create an analysis population.

The data mining models in production in Sweden are always based on binary target variables and belong to ”Classification / prediction” in order to anticipate errors / fraud. The errors may vary and it is often a change over a certain amount. Data is collected on the corporate network that is used in the models, but no real network analysis haven´t been done. The methods of cluster analysis, neural networks and gradient boosting have been tested but not yet used in production. In most cases, logistic regression is used as well as ensemble models consisting of a decision tree and logistic regression.

In some areas they have access to many observations of controls carried out while the lack of data of sufficient quality in other areas. Sweden has very little random control activities which is a shortcoming in the development of models.

Work with data mining:

- Define analysis population
- Determine the target variable
- Assess coverage
- Create analysis population
- Identify background variables
- Perform statistical analysis
- Assess the validity
- Determine the model

Define analysis population
Based on the order of selection, an analysis population (including the target variable) is defined. Analysis population is the compilation of the results of the controls carried out in the relevant field.

Determine the target variable
Target variable is determined based on the purpose and the desired effect. For example, control activities might be right or wrong, the size of failings for tax collection might be paid or not paid, a recently started businesses might remain ongoing after x year or not, and so on.

Assess coverage
The target population is the object which shall be subjected to target selection. Sweden assesses how well the coverage is consistent between the target population and the defined analysis population.

- Company form
- Type of control investigation
- Type of fault

A balance may in some cases be necessary to be made between a large analysis of the population with relatively good congruence with the target population, and a small one with good congruence.

Creating analysis population
An analysis population has to be created. In many cases, we have already created analysis populations to start with. All analysis populations should contain the taxpayer's identity, the date when the control action began, alternatively target selection was made and which accounting period the control action intended.

Identifying background variables

Sweden obtains background variables using standardized SAS flows. The flows can be used on all of our analysis populations. Our various flows can produce approx. 1.000 background variables.

Background variables could be: information on the taxpayers who have been investigated, that might describe those taxpayers who have made errors compared to the ones that haven't.

Perform statistical analysis

By studying control investigations carried out, we can describe the characteristics of the taxpayers who made errors in the various tax types, risk areas, etc. And by studying relevant background information of the companies in the analysis population, a risk profile can be developed, which describes the factors that are consistent (correlated) with an increased risk of errors.

Risk profiles are developed by statistical modelling, where the systematic testing of the developed risk indicators that best explains what makes e.g. the risk of error or risk of arrears submitted for recovery. The information that is available, and the derived risk indicators, will determine the selection criteria that are possible and the potential for the accuracy of the selections.

Assess the validity

Assess the validity of the model related to the order. The quality of the model will be assured from both a statistical and an operational perspective. Assessment is based on:

- Consistency of analysis population and target population.
- The quality of data in the analysis population (on the control investigations carried out, follow-up information, etc.)
- The relevance and quality of the risk indicators that was included in the analysis.
- The stability and "degree" on the statistical model.

Generalizability and validity should be assessed.

Determine model

Completed data mining model has to be determined. The model is then used in the selection; those with the highest risk of error are selected for processing.

Model for Tax Collection

We use three mining models to identify an increase of arrears and payment failures.
Those with risk of being submitted for recovery or already submitted are divided into three segments based on different measures. We call these new debtors, recurrent late payers and former debtors.

Debtors with debts segmented into three categories, new debtors, recurrent late payers and former debtors. For creditor actions we select the debtors with a greater probability of

debt accumulation. For new debtors, we choose also those in the lower-risk segments to work preventively and get them “back on track” as soon as possible. The target variables in the analysis population are binary 1 = debt accumulation 0 = no debt accumulation.

10.3 Denmark

What is Data Mining?

SKAT (The Danish Tax Administration) has over the past few years built up expertise and experience in the field of Data Mining. Data Mining covers the concept of a variety of techniques and concepts for analytical comparison of data from different files and production combined with advanced statistical processing and modelling of this information.

Unlike more conventional quantitative analysis, which typically results in a report or recommendation of a kind, so is Data Mining to "put the power to the analyses". The idea is to use statistical / analytical models developed through representative historical extracts from relevant databases to "score" or risk grouping.

Persons or companies from their current system status and then feed this information back to case management systems (see drawing Appendix 2). This serves the purpose that the model estimates may then be used as an intelligent segmentation or order of features in the system.

Typical sectors of the economy, which over the years has made use of such methods include banking to automatic credit, marketing world for case selection of profitable customer segments, telecom sector where it comes to predicting the "churn" i.e. in time to predict who will soon cancel their subscriptions and insurance industry, where the methods have been used partly on detecting fraud and partly to risk segmentation of the market. Basically Data Mining as the intelligent amalgamation of data and use of important systematic in the data track, which is deposited and stored in different databases and file systems.

Data Mining in SKAT

In recent years, a number of tax administrations in the most IT-mature parts of the world also started to see the possibilities of using the methods in the various branches of their business areas. Although in most countries still is a kind of pioneer work, so Denmark is in this context relatively advanced field.

EFI’s - Scoring Models[19]

Building Data Mining experience and skills in SKAT has mainly originated from EFI project where the development of statistical models based on historical analyses of data from primary systems are the system's intelligent searching component that automatically assesses the recovery actions that most cost-effectively applied in respect for different types of customer groups.

[19] ”EFI” is the new Recovery system launched on the 1st of September 2013

Recovery System EFI is built around three scoring models that operate according to the following principles: When SKAT receive a new claim it is investigated whether the claim is legally owned by a company, an independent contractor or an individual. For these three segments have been constructed separate scorecards.

A scorecard is a kind of point system based on a statistical model. The customer's current characteristics are compared with the starting scorecard point categories, and thus the customer shall receive a total score. In the current EFI's scorecard it is modelled that the higher the score achieved the more the person or the company profile is statistically similar to the persons or companies who had default payment agreements with the tax authorities in the past.

In EFI customers are sorted according to their score and divided into 3 risk groups: high, medium and low risk. These risk groups are then used during the automatic searching of which SKAT considers to be most appropriate and cost-effective compared a recovered amount of tax. Low risk groups may receive an automatically generated letter, while the more expensive human resources are used to recover the debt from high-risk segments.

Some words on the method

EFI's scorecard is designed using classical data mining method (see Annex 1). The most widely used data mining methodology is based on that statistically examine a representative historical process from the same database as a way to get a glimpse of what combination of data can be meaningfully used to predict the occurrence of a future event. The three key issues that such a process must identify are the following:

1. First of all in a modelling process the model's "target" or "outcome variable" has to be clarified. That is a precise quantitative definition of what you want to predict / set up in a model.
2. The next to be examined is: what other information can run together in a meaningful way with the outcome variable and have a strong enough theoretical and statistical explanatory power, that you believe these variables will be able to predict the outcome variable in a future period.
3. The last thing to be clarified is the question of how the explanatory variables could be combined statistically and weighted in relation to each other? This is where the various advanced modelling algorithms come into play.

Thus, it is an absolute requirement to build this type of scoring models that have collected data from a historical period where one can clearly follow individuals or companies, which fell out to either one or the other side of the outcome variable and that this history is representative and systematic enough that it can be reasonably assumed that the connections it finds will also apply in a future period. A good model or scorecard is characterized by containing a number of variables (typically 12-20), which are all relatively good (significant) to distinguish statistically between them, for example good or bad debtors while those variables are not internally too correlated (i.e. expressions of the same).
EFI models are made by first seeking out respectively the debtors that in a period of 12 months were either defaulted or met their payment arrangements. After this sample space

had been defined, there was potential explanatory information related to debtors from the tax data warehouse pooled by the file. Examples of this were the demographic and socioeconomic characteristics and conditions related to past payment behaviour.

The task of the statisticians might be to set the combination of variables that could best be used to differentiate (i.e. draw a statistical profile of) the customers who typically comply their payment agreements from those who did not.

After a Data Mining model has been constructed, one can "turn on the power" i.e. by generating an automatic process in which daily or monthly automatic ranks of individuals or companies shall be created on the basis of their latest updated data. Warning: models lose their explanatory power over time and they must be regularly monitored and renewed.

This task has been assigned to a specialized scoring team that is a small group of statisticians and business experts whose main job is to handle these tasks. The team is located in the head office department for analysis.

SKAT's Bankruptcy Score model "INDSCOR"

As a result of EFI's delay, the EFI-scoring group over the last few years have used their knowledge to develop models in other areas of the business.

The first model was delivered in early 2011 to a recovery project whose purpose was to recover debts from high-risk cases, i.e. to ensure SKAT's claims before the bankruptcy. The model was named "INDSCOR" (recovery score), and is a model that can predict bankruptcies.

The model makes it possible for business to seek out a ranked list of the companies with the highest default risk in an automated process. This information can be compared with a company's debt to the SKAT, which allows those manual resources that can be used where they create the most effective factors for ensuring receivables where the risk of loss is greater.

The model has been developed for companies with limited liability, and it has been updated several times since the creation of the original version. The latest version includes different scoring parameters such as long- and short-term trends in the company's key financial ratios, demographic parameters, preliminary fixed TAX and VAT assessment (FF history), auditor notes and bankruptcy history among board members.

SKAT's FF-Scoring Model (FF-SCOR)

FF-model (FF-scores) was developed in 2012 based on the Norwegian model. It is difficult and expensive for tax authorities to handle the process of preliminary fixed TAX and VAT assessment, when particularly small business´ forget to report VAT. It is therefore desirable to develop a series of actions that can reduce this problem and encourage companies to report on time. In order to experiment with such measures, it is advantageous to isolate the segment of companies that are at high risk not to report i.e. VAT or withholding tax.

There is therefore a developed FF-scoring model that monthly (up to each settlement period) ranks the risks of the self-employed according to their probability not to report VAT on time. The FF model is using 16 variables that represent the characteristics of those companies that typically do not report on time. An example of the significant indicators is: if the owner or the company has moved a lot the structure of the personal or business-related debts. Other important indicators might be the patterns in previous payments and the past history of a lack of VAT returns.

SKAT's Compliance scoring models (COMP_SCOR_SELSKAB & COMP_SCOR_ERHVERV)

In addition to these models, which are put in occasionally and monthly production, there are two compliance-based risk segmentation models under development. The models' purpose is to rank all active businesses in their likelihood that they will calculate their tax: 1.) Correct, 2.) Faulty or 3.) Knowingly untrue.

Such a model that can predict the taxpayers' compliance is considerably more complex to make than the previously mentioned models. Given the inherently not present fiscal basis in SKAT's production, where you can see which companies in a given fiscal year, reported their taxes properly or with a deliberate error. Such a database is present in sample size in terms of SKAT's compliance surveys every two years carried out at 3,000 companies. This study is like a '360 degrees audit' of the companies in a standardized way. The undertakings manually assigned a level of compliance from 1-6. 1 is given for deliberate tax evasion, and 6 given to have all affairs in order.

By combining the samples from 2008 to 2010 we can achieve two datasets, respectively 1,600 companies and 4,400 individual enterprises. You can then run these files along with all the (structured) information about the company, which SKAT was in possession of just before it was taken for analysis.

Then you can with conventional data mining method build a statistical model that can profile the least compliant companies from the most compliant ones. This model can, in the usual way be used to regularly score all companies concerning their compliance risk. If this model shows good results, SKAT will be able, in a knowledge-based way to use the most energy on those companies that have the highest probability of deliberate tax evasion while compliant companies where everything is in order, could be visited less frequently.

It should be mentioned that the tax authorities for many years had used a business rule segmentation model for the same purpose. This model was based on 29 risk parameters selected by business experts. The difference between such a model and a statistical "data

mining" model is that business rule models are not validated. This means that you cannot, actually have any explanatory power in relation to the level of compliance, based on statistical criteria. Another weakness is that the 29 parameters were blindly added together, and they will be included with the same weight in the compliance risk profile that you want to draw.
These weaknesses are looking for the new statistical model to be corrected by using only the parameters of the historical data is actually able to distinguish between compliant and less compliant companies, while the various risk objects are weighted the best possible way. The model is scheduled for completion in 2013.

Data Mining techniques for analysing citizens' use of E-tax
In addition to the above mentioned models preliminary analyses have been started based on Data Mining in the customer service area. The idea here is to analyse the actions of E-tax log and correlate this information with customer calling patterns to SKAT. An end product of these analyses could be a model that tells telephone agents how to best suit the customer they are talking to, and to give statistically the best advice to them.

Data Mining and Negative VAT Fraud
Last but not least there is a work in progress (along with external consultants) around some models that can maximize the likelihood of identifying negative VAT fraud. This is done by analysing anomalies in sequences of VAT reporting patterns combined with other information about the company or person circle around a business. There is a currently developed model that shall be tested by expects during 2013.

10.4 Norway

Risk analysis in the area of debt management
This holistic approach is through a method to find, understand and manage existing and potential risks that might prevent the Norwegian Tax Administration from achieving correct and timely assessments of taxes, timely payment of taxes, and good service to users/taxpayers. Benefits of risk management are:

- Better results
- Improved resource allocation (the number of potential distaints are known in advance)
- Improved level of service
- Reduced differences in practice
    - The use of the same strategy for the same type of tax payer (principle of equality)

The strategy
The strategy of using risk analysis in tax debt management is helping us to make risk analysis a part of the daily work in order to keep the focus on the main goals all the time;

- Correct and timely assessment of taxes
- Timely payment of taxes
- A high-quality National Population Register
- Good service to users/taxpayers

Why do we use risk analysis in debt management?

- Helps give priority to the most important claims (largest amount of money)
- Makes timing of the right instruments easier
  - Allows us to do what is necessary, but not more than that
  - Attachment of earnings are reduced by approximately 30 percent
  - Payment arrangements are reduced by up to 90 percent
- Helps us combine manual and automatic routines
- Allows us to
  - prioritize within collection portfolios
  - prioritize among different attainable measures
  - set the timing accordingly
- It promotes more equal behaviour among staff
- It simplifies training of new staff members
- Introducing a gentle reminder reduces the number of "angry" callers.

The strategy for risk analysis is based on 4 steps:

1.) Identifying and making priorities of the risks
2.) Methodical external and internal analyses to identifying risk that may prevent correct payment
3.) How to find and choose the optimal measures
4.) Evaluate the way we solve our tasks and improve it.

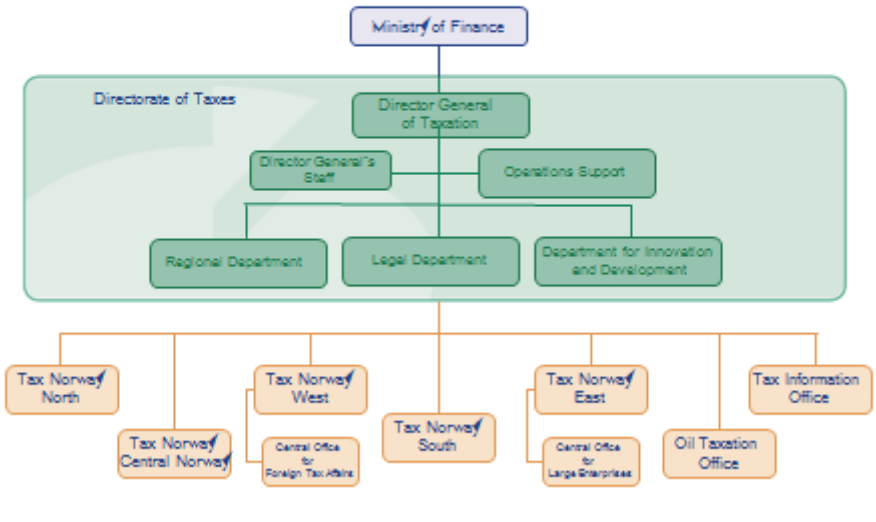
All regional operational units must carry out risk analysis within tax debt management each quarter and report this to headquarters (Norwegian Tax Administration, Directorate of Taxes).

Analysis Department:

The Norwegian Tax Administration, Directorate of Taxes has a dedicated department that specializes in analysis. The Analysis Department lies under the Regional Department and they closely collaborate with Operations Support. See organisational figures below.

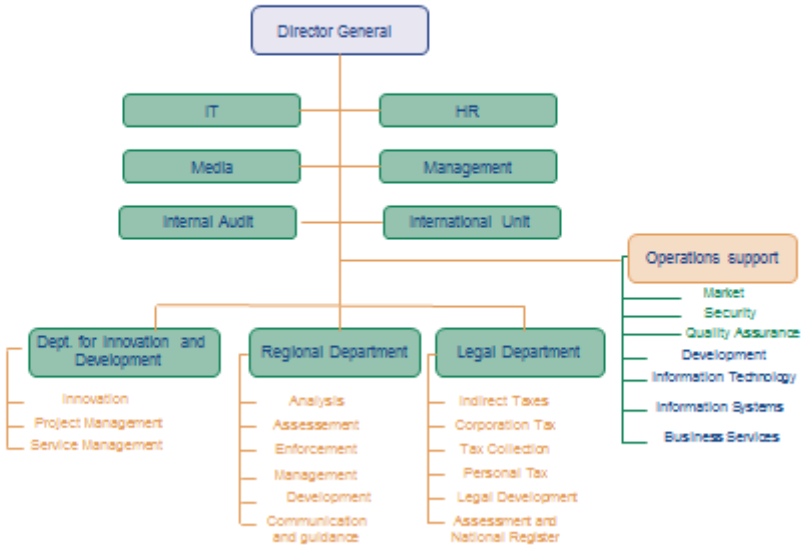
Norwegian Tax Administration

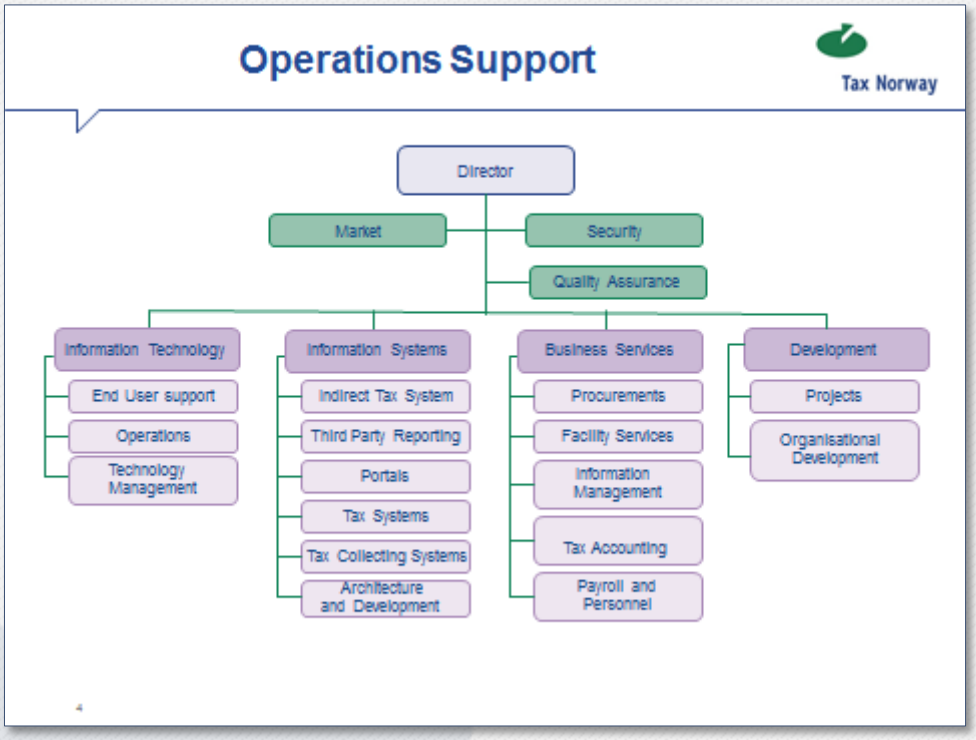
Tax Norway



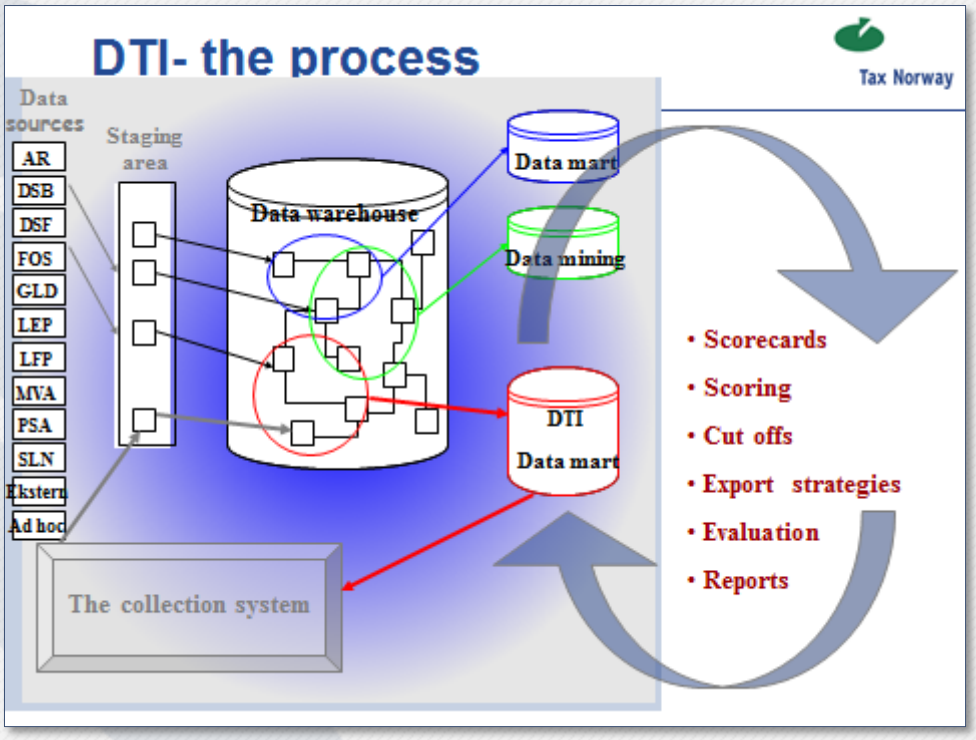
Directorate of Taxes

Tax Norway





Debtor Adjusted Enforced Tax Collection (DTI) is a result of risk profiling:



Data output categories:

1) Individuals who do not owe any taxes
2) Individuals who owe taxes
3) Companies who do not owe any taxes
4) Companies who owe taxes.

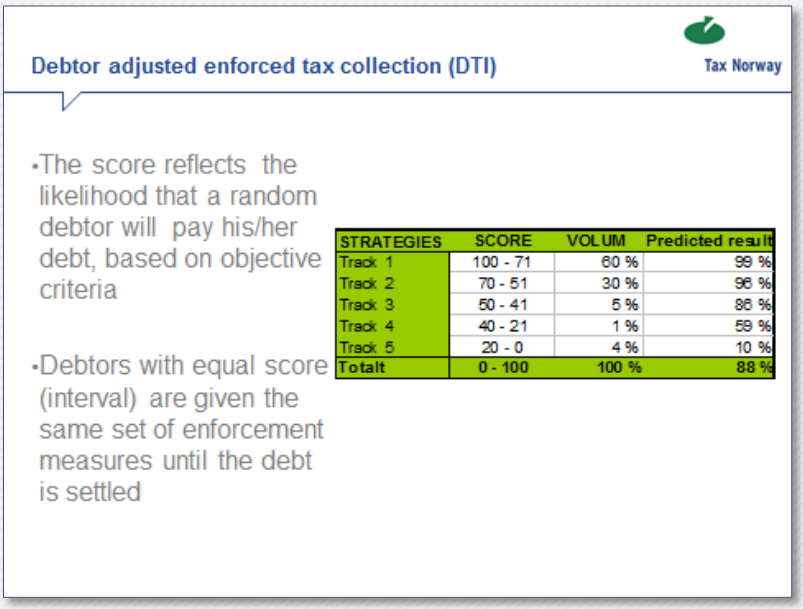
How to make good profiles:

- Estimate the future based on historical facts
- More importantly: our own facts
- Combine all factors relevant to risk
- Consider the optimal combination of factors only
- The score model structures our information.

How to make the score:

- We predict future payments of underpaid tax
  based on objective data information regarding the taxpayer
- Mixture of recent and older information
- Only the optimal combination of factors is finally used
- The number of scorecards is a result of
- The tax in question
  - Natural differences
  - Access to information
  - Significance.

Scoring works because taxpayers who fail to pay their underpaid tax on time have certain characteristics in common – and their accuracy keep over time.



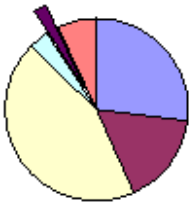
Norwegian Tax Administration

The Tracks: An overview of the instruments

Track 1	Mild §4-18	Teleph. coll.	§4-18 notice	Attach. earnings/distr.
Track 2	§4-18 notice		Attach. earnings/distr.	
Track 3	§4-18 notice	Distraint		
Track 4	§4-18 notice	Distraint		
Track 5		Manual treatment		

Norwegian Tax Administration

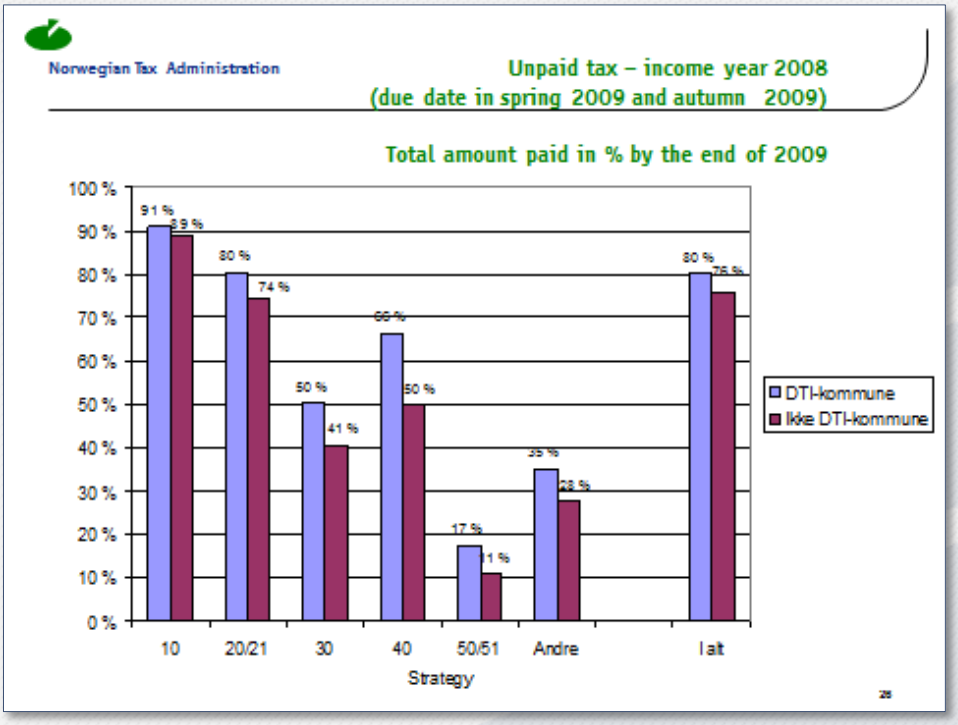
We collect 99 % overall



- **Underpaid tax – a different story**

Underpaid tax = assessed tax which is not withdrawn through the payroll during the income year

Results per Dec 31th 2009	Tax year	Total payable tax	Voluntarily paid		Enforced collection		Total collection	
		€ (millions)	€ (millions)	%	€ (millions)	%	€ (millions)	%
Underpaid tax	2007	2 157	1 720	79,7 %	266	60,8 %	1 985	92,0 %
Business tax	2004	4 648	4 573	98,4 %	43	57,3 %	4 615	99,3 %
		16823	13 414		2 071			
VAT	26,8 %	17 759						



Risk factors important to the model:
We have tested close to 200 variables with historical facts about the tax payers.

- Number of previous (still) unpaid underpaid taxes
- Amount of previous (still) unpaid underpaid taxes
- Original claim in percent of gross income
- Net wealth
- Gross income
- Changes of address in the last five years
- Amount of deposits per December 31st
- Amount of interest on deposits per December 31st
- Amount of interest on loans per December 31st
- Owner of sole proprietorship
- Unemployment benefits
- Premium for pension scheme (private and public)
- Outstanding maintenance payment
- Payment to the self-employed
- Dwelling
- Dividends

10.5 Belgium

The general administration of tax collection and debt enforcement in Belgium

According to the Belgian Tax Administration, the benefits of risk management are that this methodology enables a tax administration to recover tax debts in a more targeted way. This specific approach will be necessary in the future, taken into account:

- The continuous decrease of the number of staff in our tax administration (budgetary restrictions) during the next year;
- Changing socio-economic factors (financial - economic crisis and its repercussions on tax collection).

1. The different steps in the process according to the Belgian tax administration

In practice, for the implementation of risk analysis in the field of debt recovery, the following stages in the business process are used:

- Data collection
- Data analysis
- Selection of files
- Most appropriate recovery action
- Feedback procedure

The specific approach within collection and debt enforcement process relies on the following basic principles:

- All tax liabilities should in principle be subject to an appropriate recovery procedure;
- We are facing an increasing number of tax debts to be recovered and at the same time a declining number of staff;
- We aim for a more targeted approach by selecting a similar tax debts for which an identical recovery procedure can be applied;
- The working method should lead us to a more efficient recovery policy.

What do we mean by a more efficient recovery policy?

- The use of risk analysis must prevent the fact that fiscal debts are not being recovered because they are “lost” or “hidden” in the total mass of fiscal debts which have to be recovered by the tax administration;
- The use of risk analysis must guide local tax offices to choose or to apply the most efficient recovery procedure in the presence of identified target groups (to use a more efficient debt management policy);
- Optimal working procedures have to be developed and an optimal use has to be made of all legal possibilities which are at the disposal of the tax administration.

2. The place of the risk analysis units in the organisation

The risk analysis unit is placed on a central level in our organisation. This means that the data analysis (including the data mining) is operated by a team of analysts/data miners in our central offices in Brussels.
The implementation of the risk management process takes place in our operational units, being the tax offices for VAT and direct taxes.

3. Description of the business process

During a first phase of the application of a risk analysis methodology, the General Administration of Collection and Debt Enforcement has chosen for the implementation of so-called "targeted national recovery actions." The selection of target groups is based on:

- The application of specific tax legislation
- A thematic approach
- A sector approach (specific business sectors)

As of 2012, the General Administration of Collection and Debt Enforcement wants to mark a further important step in the use of risk analysis by the use of a data mining methodology.

In the context of debt enforcement Data mining/analytics can be used to predict and analyse areas of risk and emerging patterns in taxpayer's behaviour (propensity to pay, capacity to pay). In this matter, data mining uses historical and current data to predict future debtors' events and behaviour. This allows tax administrations to better identify risks, profile taxpayer behaviour, supports decision making and ultimately reduce debt.

The ongoing and the future Data mining projects in the General Administration of Perception and Collection

1. DELPHI AND HERMES

As soon as January 2005, the General Administration of Collection and Debt Enforcement set up, in the framework of risk analysis, a working group whose mission was to identify a particular target group "Bankruptcy". According to a predefined methodology, the working group carried out the description of the target group and a precise identification of profiles and risk factors.

Insolvency/failure prediction, and various measures of financial distress, is in fact a popular topic for the application of data mining in tax debt management. The importance of the area is due in part to the relevance for tax administrations in evaluating the likelihood that a firm may go bankrupt. Once a company goes bankrupt, chances of recovery of tax debts become close to zero. So predicting and anticipating this event affects all tax administrations. The identification of problems before default occurs and increases the ability to implement highly targeted intervention strategies fast(er).

Given the outstanding tax and the reduced recovery rate since the beginning of an insolvency procedure, the tax administration has developed a predictive model of failure of companies that aims to:

- Give timely, relevant information on the solvency of the company so that the tax collector can take appropriate recovery action before the situation is totally burdened;
- Safeguard the financial interests of the State.

In the private sector, many companies - including banks and insurance companies - are already using similar techniques to improve the recovery of their claims.

However, what distinguishes the model developed by our department is the nature of the data used to populate the model. Thus, the private sector models are generally based on accounting and financial data designed to assess the financial state of the company and to measure the financial risk through the examination of balance sheet data, which, given their delayed availability, reflect a situation that already evolved.

DELPHI model offers the originality to also extract internal data specific to the FPS, data on the fiscal behaviour of the company, especially with regard to withholding tax on wages and VAT whose non-payment is one of the first signs of failure of a company.

The inclusion of variables derived from internal databases to accounting data, can detect with more relevance and earliness, the risk of failure for a company.

For the DELPHI data mining model, the General Administration of Collection and Debt Enforcement uses the internal data of the FPS Finance as well as external data from the FPS Economy and the FPS Mobility and Transport. Building on SAS specialised software applications, we discuss and analyse these historical tax and non-tax data, forming thereby a database of several hundreds of risk indicators.

With this, we are able to make predictions about the risk profile (= solvency) of indebted legal entities. We thus obtain a scaled classification of risk ranging from 1 to 5, where 1 represents a poor solvency and a high risk of bankruptcy. The model thus meets the demand for tools allowing predicting the possible bankruptcy of legal entities. However, this bankruptcy predictive method is only one of many possible applications of the DELPHI model.

DELPHI and HERMES were implemented for the first time at the beginning of 2012. The update of the model will take place once a year and the target group consists of all active Belgian corporations.

2. PEGASUS

PEGASUS is the name of a data mining model which will be developed from the beginning of 2014. Pegasus aims to predict the likelihood that a taxpayer will pay the outstanding tax liabilities after a specific recovery procedure. In the context of Pegasus, this specific recovery procedure is in fact the visit of a bailiff.

During the first phase, PEGASUS will be implemented in the tax collection offices in charge of the enforced recovery of corporation tax. But, in the meanwhile, a project group is already currently defining al strategic choices for further implementation of Pegasus for personal income tax and VAT.

3. IRIS

A traditional method of contacting a taxpayer for the purpose of obtaining payment of outstanding tax liabilities has been an outbound phone call. Given that customer selection is largely random and that the human resources of the debt recovery teams are limited a particular data mining model, we called IRIS, will be built in 2014 in order to predict the response of debtors if contacted by phone.

By ranking and selecting debtors based on predicted scores, the results greatly assist the tax administration's resource-limited debt recovery teams.

Before building at the end of 2014, we started a so called "data gathering procedure" in November 2013. This data gathering is organised in the tax collection offices in charge of direct taxes and of VAT. The purpose of the data gathering is to be able to develop the data mining model based on the feedback which will be provided to the data miners during the next 3 months and which is provided from the operational units.

Conclusion

Regarding risk analysis in the field of debt recovery and enforcement, the Belgian General Administration of Collection and Recovery will without a doubt put the emphasis on the further development of data mining models in order to tackle the continuing decrease of staff and to be mostly effective and efficient.

11 Final Conclusions

11.1 Introduction

In order to achieve a major task being to secure revenue collections in fair and correct manner, objectives and main goals are defined by management of the administration. Objectives describe the desired outcome and state what has to be achieved at any level within an organization and what risks are to be identified. The objective of tax administrations may be constant - to optimize collections and increase the level of voluntary compliance. The use of risk analysis process can contribute to the achievement of established objectives. Risk analysis is still a developing and relatively new area for most tax administrations, particularly in the field of debt management.

11.2 Understanding the meaning and advantages of the use of risk analysis in tax debt management

Risk analysis comes from the basic principle where understanding tax debtors' behaviour is the first step towards managing tax debts. In the efforts to advance collection and recovery of tax debts, tax administrations are guided by perceptions of what drives behaviour of defaulted taxpayers and are consequently pointed towards applying the most appropriate treatments to influence those behaviours in a desired direction.

All tax administrations have limited resources when it comes to staffing and funds. This means that effective tax administrations have to be about optimizing collections and use the funds where the administration is most likely to collect to most. The tax administration must make the most efficient use of the limited human and other resources and must try to minimize the cost of enforcement[20].

Effective use of risk analysis leads a tax administration to a more efficient recovery policy and enables it to recover tax debts in a more targeted way. This is especially important in the face of increasing levels of tax debts, decreasing number of staff or budgetary restrictions and changing socio-economic factors like financial – economic crisis and its repercussions on tax collection.

In order to manage effectively tax debts and debtors, tax administrations would need to have a risk analysis strategy in place. Some of the surveyed tax administrations have developed risk analysis strategy and processes aimed at managing tax debts. However, each of the IOTA member countries is convinced of the benefits of using risk analysis in debt management. All countries are in agreement that risk analysis creates advantages and added value by supporting the organization's objectives namely:

- Improving decision-making and planning
- Contributing to a better allocation of resources
- Optimizing operational efficiency

[20] Compliance Risk Management: Managing and Improving Tax Compliance, OECD, October 2004, p. 4-8

- Protecting the organization's image, especially when it comes to a public entity.

Recurring concept is that the use of risk analysis enables tax administration to choose specific strategy towards certain categories of taxpayers with the highest risk profile. At the same time they can make best use possible of scares resources and achieve greater yield in revenue payment.

The time factor is also considered to be very important in using risk analysis. Identifying taxpayers' non-compliance upfront allows tax administration to better plan and to take immediate action. It would send a signal that they are under continuous monitoring and it would reduce the risks of revenue losses.

11.3 Different stages of risk analysis

Many of the surveyed countries have a strategy in using risk analysis for managing tax debts or have a general strategy for risk management which they also apply in the area of debt management. Even though some tax administrations are still in the process of developing a policy or strategy on using risk analysis in debt management or they are at an early stage where different approaches are still being tested through pilots, their overall focus is on building overall capability, data integrity and data structure to develop, subsequently, a more sophisticated approach to debt management.

Fundamental aspect for tax administrations is to be able to determine possible indicators of taxpayers' failure or deliberate unwillingness to comply with tax payment obligations. In the area of tax debt management, tax administrations have adopted different methods of identifying and determining the risks related to the debtors as well as to the debts along with the external and internal risks. Determination of these risks is mostly done by combining different key risk indicators. The most used indicators are: amount of tax debt, tax debt history, late or no submission of tax returns, type of business entity (legal form) and age of tax debt. To create further segmentation, tax administrations form categories of risk indicators which are mainly based on the type of debt, debtors or enforcement action. The most common way of categorisation is by debt.

In the process of risk prioritisation, tax administrations should be able to distinguish the major risks from the minor ones and to operate with a set of factors common for all types of non-payment risks in order to be able to comparatively analyse and rank them on a regular basis.

Segmentation on amount of debt, date of debt, amount of debt, position (active of passive), type of debts (man debt, interest or penalty) or type of tax (income, profit, VAT, property tax) are the most commonly used. For the debtor the classification is done by compliance behaviour, category of debtor, size of company and economic activity.

Evaluation of risk analysis process is mostly carried out by monitoring the value of the unpaid taxes or by analysing information on revenue collection outputs. If any significant features are discovered, the reasons for these features can lead to a change in the risk

indicators and/or risk analysis strategy. Another way of evaluation is through the measurement of tax filing and payment compliance: the higher the rate of tax filing and payment compliance, the less likely there will be any creation of arrears. The outcome of the risk analysis is mostly used in the stage of the enforcement. It is used especially while dealing with instalment arrangements.

11.4 Organisational and technological solutions for using risk analysis in tax debt management

In order to effectively and efficiently use risk analysis within tax debt management area tax administrations should secure a sufficient level of staff operating within the risk analysis function and should give serious consideration to the importance of developing their knowledge and skills. The dedicated unit in charge of all stages of risk analysis within the debt management area can be situated on central level, decentralized or combination of both.

With an ever increasing role of risk analysis in enhancing debt enforcement procedures and activities to allow management to define the most efficient strategy, the architecture and support of IT systems is highly required. There is a wide range of application of business intelligence solutions that is already in use or under development. The solutions that are currently used by tax administrations for debt management are commercial software and applications, and free open-source tools. With the use of data warehouse technologies tax administrations can conduct automatic extraction and transformation of big data and optimally organise it for the risk analysis process. IT needs to support debt management during all phases of the risk analysis process and the majority of IOTA members have implemented or are in the middle of developing IT solutions in their debt enforcements units.

11.5 Benefits of using data mining in tax debt management

Data mining leads tax administrations to a better understanding of debtors' behaviour. Once they know who the debtors are, why the debt arrears occur, and under what conditions debt has a high probability of occurring, tax administration can select the most effective strategy of risk analysis. It is possible to detect which activity sequence patterns are associated with debts, and then to prevent or reduce debts.

The discovered patterns may be used to analyse those taxpayer groups with high probability of non-payment, so that appropriate actions can be suggested for next step under a given situation to reduce the probability leading to debt. Consequently, by using predictive analytics and "what-if" scenarios, tax administration can proactively engage with taxpayers before problems emerge. Furthermore, it provides for testing and optimising debt management strategies, and thus ensuring that only initiatives suitable for identified groups of taxpayers are implemented at the lowest possible cost.

Based on the analytical model's predictions about taxpayer's payment behaviour tax administration can alter its treatment activities. For example, when a tax administration can accurately predict that a taxpayer is going to be insolvent, it is more efficient to write the debt off at an early stage prior to undertaking enforcement measures which can be expensive for both tax administration and the debtor.

There are endless opportunities for data mining - tax filing and payment patterns can be mined to create taxpayer segments. Information about taxpayer response to enforcement actions can be mined and combined into models to improve and better target future campaigns. Analysis of taxpayers' financial capacity to fulfil tax obligations can be further explored to forecast future insolvency. Of course all this requires a data mining experience and the IT infrastructure to support this process.

11.6 Risk analysis in tax debt management in a future perspective

Development of the risk analysis is potentially moving towards a more modern and advanced approach using innovative tools and techniques. The public sector is gradually following the private agencies with application of modern techniques in debt enforcement and recovery. Despite the challenges of downsized budgetary allocations, governments need to recognise the advantages of investing into IT support and development of experienced and educated staff within tax administrations if they want to see them being more efficient with the use of risk analysis in tax debt management.

12 Annexes:

12.1 Glossary

Bailiffs	A bailiff is a sworn civil servant working for the tax office. His job contains of execution tasks (seizing and executing) as well as serving notifications etc. If in your country the bailiffs are told by the tax collector what to do, risk analysis could be used to control their workflow.
Data	Information, of intern (fiscal) or extern nature, relating to taxpayers for use by tax administrations.
Data mining	Data mining is the exploration and analysis of large quantities of data in order to detect patters and rules. Tax administrations can use data mining to detect fiscal fraud and to predict situations of non-compliance.
Data Warehouse	A data warehouse is a subject-oriented, integrated, historical and stable collection of data in support of management's decision making process. A data warehouse is a system that extract, cleans, conforms and delivers source transactional data into dimensional data store and these are specifically structured for query and analysis.
Debt write-off	The decision not to take any more action in trying to collect the debt.
Enforcement	To impose or implement actions within the area of debt management and collection (i.e. reminders, instalments, seizure of movable/immovable goods).
Evaluation	Comparison of the planned and realised effectiveness/ efficiency and the analyses of the differences between both.
Execution	To impose or implement actions within the area of debt management and collection after enforcement actions (i.e. recovery, collection or procedure of foreclosure).
Issued Guarantees	A guaranty by which one person assumes responsibility for paying another's debts or fulfilling another's responsibilities.

NACE	The NACE Code is a numerical code adopted by the European Union and its member states, assigned to a particular class of economic activities. The first four digits of the code, which is the first four levels of the classification system, are the same in all European countries.
Online Investigations	To search information on computer software which is made available to be studied by anyone and for any purpose (i.e. internet).
Open Sources	Computer software which is made available to be studied by anyone and for any purpose.
Operational Controls	All actions and enforcements within the tax administration, including reviews, audits and other controls.
Risk	The threat or probability that an action or event, will adversely affect an organisation's ability to achieve its objectives.
Risk Analysis	The phase in which identified risks and risky taxpayers are systematically weighted and grouped in relative order.
Risk Categorization	To categorize the identified risks into different groups.
Risk Identification	The phase in which sources and signals are transferred into a list of potential risks.
Risk Indicator	A weighted variable pointing to a potential risk. A risk indicator can provide us with a prior notification of its possible risks when used in mathematical formulas or models.
Risk Prioritising	Weighing the risks and putting them in order of importance.
Statute of limitation	The legal system is limiting the time for collection/recovery of a debt after it has occurred.
Surveillance	Monitoring the behaviour of activities or other changing information.

12.2 References

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