Committed to our clients

Consistently exceeding the expectations of our clients is instrumental to building our leadership position in the business consulting industry.

>1,000
global and local clients

150
of which are new

>100
specialized publications

Client focus

The client is the reason we are in business and is our main management priority

Our success is due to our clear focus on the client, with whom we work closely and whose expectations we strive to exceed in order to become a trusted partner. We implement a client relationship model that allows us to know each client's specific needs and to be in a position to offer each client a differentiated value proposition.

Management Solutions provides value-added services that stand out for the durability of results and practicality of implementation.

Client diversification

Management Solutions pursues sustained growth supported by client diversification, seeking a balance between large multinationals and national leaders. At year end, Management Solutions had over 1,000 active clients (150 of them acquired in 2020), grouped into three major segments: multinationals of American or European origin, local entities, and national or regional confederations, which are all leading organizations in their respective markets.

In addition, Management Solutions has continued to strengthen links with regulators (central banks, international organizations, national regulators and supervisors, etc.) in the main industries in which we operate.

Global model

Management Solutions has a strong presence in local markets, but always under the umbrella of global corporate policies. The whole Management Solutions group operates as a single unit rather than an association of local firms under one brand.

Acting and feeling as part of a team, sharing the Firm's mission, goals, culture and values, are essential to successfully meet our clients' transformation processes and strategic challenges, wherever they arise.

Quality control

As a professional services firm, our mission is to develop solutions that help our clients to fulfill their objectives as effectively as possible. We are firmly committed to offering services of the utmost quality, as this is the underlying motive of all our actions and the driving force behind our growth.

For this reason, all of our internal processes are subject to strict quality rules in the belief that, with the support of our highly conscientious professionals, they will facilitate the achievement of this fundamental aim. This level of quality is based on the expertise of our professionals, for whom there are ongoing training and refresher plans, and on the direct and active participation of more experienced staff on each project.

Quality control methodology

The main aim of our quality system is to guarantee that every job meets the levels of quality, value and service expected by the client. Accordingly, as a minimum, we must ensure that:

▸ There is coherence and consistency between the job to be done and the final product, both being clearly documented.

▸ The necessary knowledge and experience have been applied.

▸ The specified work has been competently carried out and correctly documented.

▸ The final products satisfy the specific requirements and are produced within the agreed upon time frame.

Each project is broken down into different activity stages or groups of activities.

The activities to be performed, their order and required techniques are detailed for each project stage while the resulting deliverables and roles involved in their production are also specified.

We perform quality control from beginning to end on all projects in order to guarantee quality levels both internally and externally (services provided to clients).

Management Solutions has a Quality and Internal Audit Area whose aim is to strengthen the Firm's control framework and to ensure it complies with regulatory requirements (certifications, audits, etc.).

This area is global in scope and covers functions related to business activities as well as provides support to our professionals across the Firm's units. They are responsible for the following:

▸ Corporate policies.
▸ Quality (certifications from quality assurance agencies, Quality Assurance process, etc.).
▸ Criminal risk management and proposal contract clauses.
▸ Internal audit.

ISO 9001 quality certification

The Spanish Association for Standardization and Certification (AENOR) acknowledges that Management Solutions' management system is compliant with the ISO 9001 standard for business consulting activities and related technologies.

UNE-EN ISO 9001 certification shows that the management system implemented in the Firm meets the highest quality standards, ensuring resource availability, process control and continuous improvement in the provision of services.

Providing top quality service is at the core of our business

Quality Control Methodology

Activities
▸ Project scope review
▸ Definition of review milestones
▸ Design review
▸ Intermediate review
▸ Final review
▸ Project file

Deliverables
▸ Review plan
▸ Review reports
▸ Design/intermediate review reports (for internal use)
▸ Final analysis
▸ Final report
  - Proposal accepted by quality control
  - Document of acceptance from client
  - Authorized quality control documents
  - Finance and billing structure
  - Project plan with assigned responsibilities for each task
  - List of deliverables
  - Client satisfaction survey

Commitment to the industry

We share the expert knowledge generated by the Firm

In addition to conducting specific conferences on relevant topics of interest related to the Firm's areas of operation, we have an ongoing schedule of external knowledge sharing activities, some of the most significant being our publications and our presence in professional forums.

In this chapter, we highlight the main activities carried out in the field of specialized dissemination during the year.

Publication of studies and industry reports

During 2020, Management Solutions published four white papers related to the management of risks associated with climate change, the automation of machine learning models (AutoML), and the management of the COVID-19 pandemic (dealing with both business continuity and reactivation plans for companies). The content of these documents, which are available for consultation in the "Publications and events" section on our website, is summarized below.

Managing climate change risks

Over the past two decades, concern for environmental degradation and climate change has gradually increased; as a result, it has been occupying a relevant place in the political agenda.

Scientific studies conducted so far have set out to demonstrate the man-made origin of this change, arguing that the continuous emission of greenhouse gases (GHG) is causing an increase in the average temperature of Earth, which will have serious social and economic consequences in the medium term.

Initially, the focus was on the impact of economic activity on the environment and, derived from it, the necessary promotion of more respectful environmental practices. This is reflected by the extensive adoption of international standards such as the GRI Sustainability Reporting Standards. However, in recent years, numerous internationally renowned actors in the public and private sectors have strongly emphasized the consequences to which countries, companies, the financial system and the global economy are exposed. This has brought the need to understand the risks associated with global warming and the necessary transformation of the current production model to the top of the international political agenda.

The environmental impacts derived from climate change
Together with the increase in the rise of sea level caused by the melting Arctic areas and the acidification of the oceans, various sources point to the increase in the frequency and severity of extreme events such as hurricanes or floods as one of the main consequences of climate change. These phenomena could cause serious damage to the world economy. According to the

latest study by the renowned Carbon Disclosure Project, the world's largest 215 companies estimate that their potential loss in asset value due to adverse climate impacts would be around 170 billion dollars, representing about 1% of their market capitalization.

An example of this is that of PG&E, the main electricity supplier for the state of California, considered by many to be the first case of bankruptcy to be directly caused by the impact of climate change. After the devastating fires that ravaged California in the fall of 2018, the electricity company officially declared itself bankrupt, as a consequence of the terrible damages suffered in its infrastructure as well as having to face millions of obligations for its role in the origination of those fires due to its electrical system. It is broadly accepted that extreme drought and heat conditions were decisive in the start, spread and severity of the fires. Another example is that of the insurance sector, known to be one of the industries most exposed to physical risks arising from climate change. Annual insured losses globally have increased 20-fold since the 1970s, reaching an average of 65 billion dollars during that decade. In 2018, this figure already was 85 billion dollars.

Some regions of the world and economic sectors will be particularly exposed to the risks of an increasingly unstable climate and rising water levels. However, in a globalized economy, climate change will affect all countries and industry sectors to a greater or lesser extent and will pose an important challenge to the stability of the global financial system.

Finally companies will have to face the challenges of adapting to greater social awareness, new regulations and their impact on financial markets.

Social context
Concern for climate change has taken a leading place in global collective consciousness. Many studies show that a large number of consumers would not only change their habits in order to lessen their impact on the environment, but would also like companies to help them live more sustainably. In the US market, data shows that during the 2014-2017 period there was growth in sales of products classified as "sustainable", superior to conventional products.

This trend is leading to the emergence of new opportunities and business models based on respect for the environment, resource sharing and sustainability criteria. It is also generating risks, such as those derived from how society has come to perceive certain industries as having a negative impact on the environment, as reflected by the increasingly common social movements demanding that governments and companies take drastic measures to combat global warming.

As a result of the above, over the last few years there has been a wave of judicial processes that have set a new precedent, as they have introduced the concepts of "climate responsibility and climate rights". This phenomenon is gaining special strength in the United States, and it is not surprising that fossil fuel companies are the ones most affected. According to Michael Gerrard, founder of the Sabin Center on Climate Change Law at Columbia University, more than 1,000 climate lawsuits have been initiated in the US.

One of the most controversial recent cases has been the lawsuit against oil giant Exxon Mobil. The company was accused by the states of New York (and recently acquitted by this state) and Massachusetts of misleading its shareholders about the real costs and risks of climate change in the company. Total is another oil company that has also been sued by several cities and NGOs, accused of not making sufficient efforts to mitigate climate change. Also, more than 10 cities in the USA, from New York to San Francisco, have sued large fossil fuel companies for the damages suffered as a result of global warming. In addition, in 2018, a group of fishermen from California and Oregon sued 30 large fossil fuel companies for their role in climate change and the damage caused to their activity. Lastly, in line with this wave of judicial processes, a Filipino human rights commission opened a judicial hearing in New York to study whether large oil companies are violating human rights by being direct contributors to climate change.

The public sector has also been impacted by this wave of litigation from climate change. In recent years, citizens from the US, Canada, Netherlands, Ireland and Pakistan, have sued their governments for not acting with sufficient determination to reduce greenhouse gas emissions and drive a transition to a sustainable economy.

This upward trend in litigation from climate change is a huge risk for companies, especially those in industry sectors that cause large-scale GHG emissions.

Multilateral initiatives and regulatory initiatives
The Paris Agreement established objectives at international level in order to "keep the global average temperature increase well below 2°C with respect to pre-industrial levels, and continue efforts to limit that temperature increase to 1.5°C". This commitment implies that the signatory countries must establish measures to quickly reduce their greenhouse gas emissions and favor the transition to a decarbonized economic system, which requires a drastic transformation of the economy in all productive sectors.

However, an unanticipated transition to a low-emission economy could originate major shocks in the global economy. Therefore, in recent years, various regulatory bodies and multinational entities, mainly in the financial sector, have focused on developing recommendations, and subsequently

regulations, to favour the consideration and management of risks arising from climate change. Their aim is twofold: on the one hand, to better understand the climate risks to which the economy is exposed in order to manage them, and on the other, to favor the transition towards a low GHG emission economy through the acknowledgement of these risks. From the recommendations of the TCFD, which are being adopted by key organizations in both the public and the private sectors, to recent EU and Bank of England regulations, the standards and regulations on climate risks have not stopped moving forward, expecting momentum to continue into the coming years.

The adaptation of financial markets
On the other hand, the growing demand for "green" financial products by investors, together with unclear standards in relation to what is considered a sustainable financial product

(including significant methodological differences in how specialist agencies rate ESG issues) has resulted in the growth of the so-called "greenwashing" effect. To address this, security markets regulators from different geographies have taken different measures to make sure criteria are implemented in a more transparent and homogeneous way (e.g. Sustainable Finance Plan for the EU, or the review by the British FCA of the "ethical investments" sector).

A context of new opportunities
Despite its inherent risks, climate change also brings new business opportunities, mainly in those areas that are conceived as solutions to the problem. Such is the case of low-carbon emission products and services, transports that do not involve intensive use of fossil fuels (e.g. rail and electric vehicles), alternatives for generating and transporting

electricity through renewable or less polluting energy, engineering for the design and construction of plants in which these alternative energies are generated, etc. Additionally, climate change is perceived as an opportunity for companies to improve their positioning and reputation.

An example of these are the strong stock market revaluations experienced by those companies that have opted for green energy, so much so that it caused concerns that too high valuations might lead to a "green bubble".

In this context of new investments, the President of the European Commission (EC), Ms. Úrsula Von der Leyen, communicated in her opening speech at the UN Climate Change Conference (COP 25) in Madrid that the EU would publish a European Sustainable Investment Plan as part of the New Green Pact, which will include an investment of one trillion euros over ten years. She also referred to that plan as the "new growth strategy for Europe". The Governor of the Bank of England (BoE), Mr. Mark Carney, who also spoke on the matter at COP 25, estimated that an investment of about $90 trillion dollars in infrastructure between 2015 and 2030 will be necessary, which would mean great opportunities in different sectors (e.g. energy, transport or food).

The channelling of funds towards these opportunities manifested in the financial sector with the booming supply of specific financial products such as "green bonds" (fixed income products aimed at financing projects that meet certain environmental criteria, activities identified as sustainable or projects whose aim is to mitigate climate risk).

"2020 Climate Risk Report", Risk.net

Risk.net magazine, a leading risk management publication, has enlisted Management Solutions to participate in its special issue on climate risks. The firm sponsored Risk.net magazine's special "2020 Climate Risk Report" issue, featuring an article by Management Solutions which, under the title "Climate risk management – A self-assessment of progress", discusses some key ideas aimed at helping companies self-assess their climate risk management maturity.

The document also includes the participation of Management Solutions partner Ms. Soledad Díaz-Noriega in its panel discussion "A sea change – Driving awareness to confront climate risk", in which different experts address topics of interest around measurement methodologies, reporting, organization, and the management of risks arising from climate change.

Additionally, other products have been developed within the financial sector that can reduce the required impact of capital investment on climate change. Some of these new products are green loans and deposits, energy efficiency financing plans, support for innovative start-ups, linking interest rates to sustainable performance or conservation finance.

Conclusions
Economic actors will face enormous challenges to adapt to the new social context, growing regulatory pressure and increasing demands from investors as a result of climate change. The starting point is to recognize this risk as an emerging transversal risk which companies need to examine in greater depth to ensure they understand its nature, to properly assess its impact and to embed it into their risk management frameworks. In parallel, they should review their strategies and undertake plans to transform their business models.

In this context, the paper aims to offer a perspective on the present and future of the risks associated with climate change for organizations. For this, the document is structured in the following sections:

▸ In-depth look into the nature of the risks associated with climate change together with a vision of the associated regulatory framework.

▸ Review of the risk management principles for these risks applied to different aspects: risk map, governance, evaluation methodologies, embedding into business as usual and generation of reporting.

▸ In-depth look into the methodologies for assessing these risks in the financial sector and their different regulatory and management uses.

▸ Analysis of the incorporation of climate change risks in the valuation of financial assets.

Auto Machine Learning, towards model automation

A mathematical model is, in a way, a simplification of reality that takes advantage of the information available to systematize decision-making. This simplification allows hypotheses on the behavior of both variables and systems to be evaluated through their summary representation under a set of postulates, usually based on data and applying inference criteria. Its main purpose is to explain, analyze or predict the behavior of a variable.

The current revolution in modeling techniques, coupled with increased computing power and more accessible and greater data storage capacity, has radically changed the way models have been built in recent years. This revolution has been a key factor that has stimulated the use of these new techniques not only in decision-making processes where traditional approaches were used, but also in areas where the use of

models was not so common. Finally, in some industries, such as the financial sector, the use of models has also been driven by regulation. Standards such as IFRS 9 and 13 or Basel II have promoted the use of internal models with the aim of adding sensitivity and making the calculation of accounting impairment or financial risks more sophisticated.

Although it may appear otherwise, the most common modeling techniques currently used in the business field do not have a recent origin. Specifically, linear and logistic regressions date from the 19th century. However, for some time now there have been significant developments in new algorithms that, while aimed at enhancing how patterns are found in the data, also introduce new challenges such as the need for improved interpretability techniques. The use of these new mathematical models in computing is a scientific discipline known as Machine Learning, since it allows systems to learn and find patterns without being explicitly programmed to do so.

Commitment to the industry

There are multiple definitions of Machine Learning, two of the most illustrative being those of Mr. Arthur Samuel and Mr. Tom Mitchell. For Mr. Arthur Samuel, Machine Learning is "the field of study that gives computers the ability to learn without being explicitly programmed", while for Mr. Tom Mitchell it is "a program that learns from experience E with respect to some class of tasks T and performance measure P, if its performance at tasks T, as measured by P, improves with experience E". These two definitions are usually related to unsupervised and supervised learning, respectively.

As a consequence, the appetite to properly understand and draw conclusions from data has increased dramatically. However, at the same time, implementing these methods has required changing multiple aspects in organizations and is, in turn, a source of potential risk due to development or implementation errors or inappropriate use.

Advanced modeling improves business and operational processes, or even facilitates the emergence of new business models. An example can be found in the financial sector, where new digitization methodologies are modifying the current value proposition, but also adding new services. According to a survey conducted by the Bank of England and the Financial Conduct Authority on almost 300 companies in the financial and insurance sectors, two thirds of the participants used Machine Learning in their processes. Machine learning techniques are frequently used in typical control tasks, such as money laundering prevention (AML) or fraud detection, the analysis of cybersecurity-related threats, and in business processes such as customer classification, recommendation systems or customer service through the use of chatbots. They are also used in credit risk management, pricing, operations and insurance underwriting.

Other sectors have seen a similar level of development. The use of Machine Learning models is common in industries such as manufacturing, transportation, medicine, justice or the retail and consumer goods sectors. This has caused investment in companies dedicated to artificial intelligence to increase from a total of $ 1.3 billion in 2010 to $ 40.4 billion in 2018. The expected return justifies this investment: 63% of companies that have adopted Machine Learning models have reported increased revenues, with approximately half of them reporting an increase exceeding 6%. Likewise, 44% of companies reported cost savings, with approximately half of them achieving savings over 10%.

Of the different changes made by organizations to adapt to this new paradigm, talent recruitment and retention is still central. To begin with, companies have needed to enlarge their teams specializing in Machine Learning. The demand for professionals in this field increased by 728% between 2010 and 2019 in the United States, with a qualitative change in the demand for general data scientist skills and knowledge also being notable.

But this demand for generic Machine Learning and data scientist skills is not always the case: in order to analyze the increasing amounts of data available using increasingly sophisticated tools, requirements for skills have become more specific to include knowledge of different programming languages such as Python, R, Scala or Ruby, the ability to deal with databases in Big Data architectures, knowledge of cloud computing, advanced mathematical and statistical knowledge, and specialized postgraduate training. Consequently, many different jobs in the market have become hard to fill due to their highly specific skill set requirements. In addition, the rate at which companies are generating data means that, even with a stable supply of data scientists, the current recruitment solution is not scalable.

However, it is not only necessary to have specialist teams, but also to implement new development procedures, review validation methods, revise and assess models in the validation and audit areas, and make important cultural changes in other areas for this implementation to be effective. The use of these new processes creates a chain reaction that affects the entire model life cycle, including notably the identification, management and governance of model risk. Many of these models also require supervisory approval, as in the financial industry (e.g. capital or provision models), or in the pharmaceutical industry, which adds new challenges such as the need to ensure the interpretability of the models used, as well as to develop other elements of model confidence.

Another notable aspect of the investment in Machine Learning methods is that its development is uneven across organizations: the need to undergo validation, audit and approval processes established by regulations, or the requirement to maintain specific documentation standards, is creating differences in the implementation of internal models across firms. According to the EBA's Big Data and Analytics report, financial institutions are adopting digital transformation programs or promoting the use of Machine Learning techniques in areas such as risk mitigation (including automated scoring, operational risk management or fraud) and Know Your Customer processes. However, "although the use of Machine Learning may represent an opportunity to optimize capital, from a prudential framework perspective it is premature to consider the use of Machine Learning techniques appropriate for determining capital requirements".

There are also operational risks that are difficult to detect, such as those arising from human error during model implementation, or those related to data storage security, which should be properly managed to ensure Machine Learning systems are used in a suitable environment. An example of this is the framework established by the European Commission in these cases, covering different aspects of the modeling process. Finally, and also due to both regulatory and
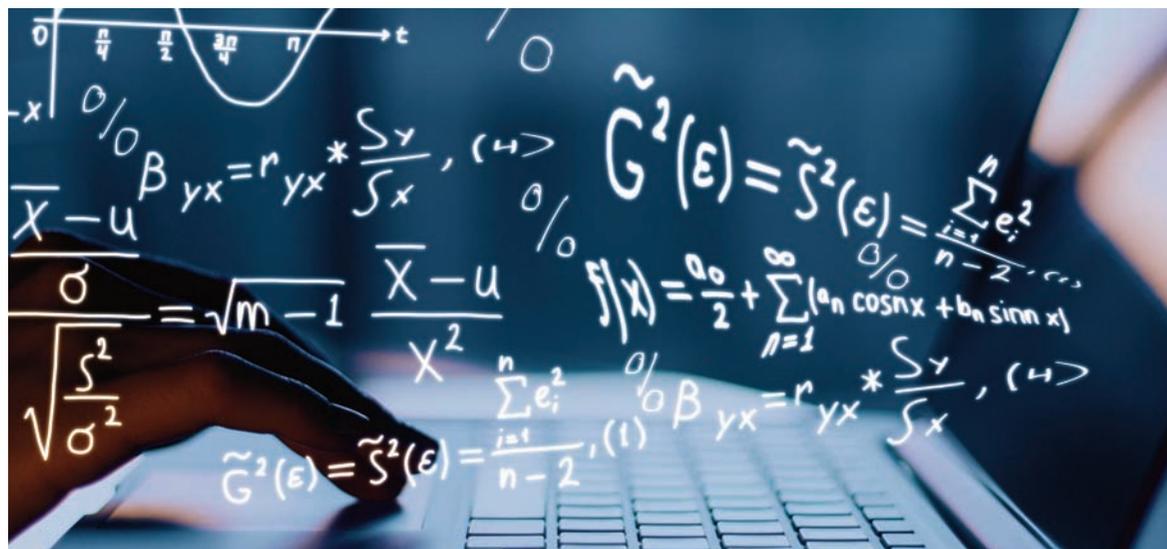
management considerations, models need to operate reliably and be used ethically so that they can be trusted in the decision-making process. The EBA's proposal in this regard, based on seven pillars of trust, is of particular interest: ethics, interpretability, avoidance of bias, traceability, data protection and quality, security and consumer protection. These issues have also been identified as key elements by universities and business spheres.

In this context, different model development tasks demand very different times: the tasks prior to and complementary to analysis also require a large amount of time and resources to prepare, clean and generally process the data; 60% of a data scientist's time is spent cleaning data and organizing information, while 9% and 4% of their time is spent on knowledge discovery tasks and algorithm tuning, respectively. All this drives the need to change the way in which model development, validation and implementation is approached, to

take advantage of the new techniques while solving the difficulties associated with their use, as well as mitigating any potential risks.

For the reasons outlined above, there is a clear trend towards automating processes related to the use of advanced Analytics techniques – generally called automated Machine Learning or AutoML, whose aim is not only to automate those tasks where heuristic processes are limited and easily automatable, but also to allow for more automated, ordered and traceable algorithm and pattern search processes to be generated. According to Gartner, more than 50% of Data Science tasks will be automated by 2025.

Furthermore, this trend towards automation offers a number of opportunities, such as the ones offered by the automation systems architecture in terms of workflow design model inventory, or component validation. Automated Machine

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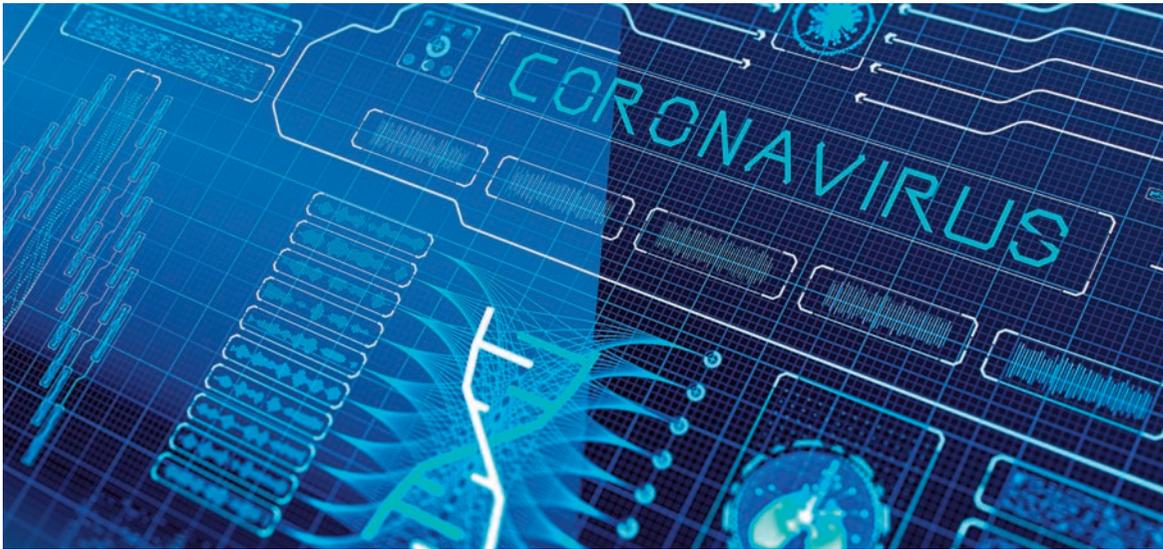
Learning systems integrate various tools to develop models, also reducing cost, development time and system implementation errors.

AutoML systems and methods seek, among other things, to:

▸ reduce the time spent by data scientists on developing models through the use of Machine Learning techniques, and even to allow non-data scientist teams to develop Machine Learning algorithms;

▸ improve model performance, as well as model traceability and comparability against manual hyperparameter search techniques;

▸ challenge models developed using other approaches;

▸ leverage the investment made in terms of both time and resources to develop codes and improve the system's components efficiently and with greater traceability;

▸ and simplify the validation of models and facilitate their planning.

Against this backdrop, the white papers aims to describe the key elements of AutoML systems. For this purpose, it has been structured in three sections, with three objectives:

1. In the first section, the factors explaining the move towards the automation of Machine Learning processes are analyzed, as are the reasons underlying the development of AutoML systems, through both their componentization and automation.

2. The second section provides a descriptive view of the main AutoML frameworks, and explains what approaches are being followed, both in the academic field and in practical experiences aimed at automating modeling processes through Machine Learning techniques.

3. Finally, the third section aims to illustrate the results of AutoML system development, presenting as a case study a competition organized by Management Solutions in early 2020. The aim of this competition, aimed at MS professionals, was to design an Automated Machine Learning model.

COVID-19: proposals for action to ensure business continuity

On 31 December 2019, the World Health Organization office in China was informed that a pneumonia of unknown cause had been detected in the city of Wuhan, in Hubei province. The new coronavirus, associated with other known viruses such as SARs and MERs, was given the name SARS-CoV-2 while the disease caused by the virus received the name COVID-19. On 30 January, after detecting virus outbreaks in countries other than China, the WHO declared an International Health Emergency.

On 11 March 2020, when the number of infections soared to 118,000 cases across 114 countries, the coronavirus was declared a pandemic so that governments worldwide would take the necessary measures to contain its spread. Two weeks later, the impact of the pandemic grew to more than 400,000 confirmed cases of infections by SARS-CoV-2 and over 18,000 deaths in 196 countries. Since then, SARS–CoV–2 continues to cross borders and maintain an exponential growth rate, doubling the number of people infected every few days in many countries.

In order to mitigate the effects related to the spread of the pandemic, governments have been forced to take swift action and adopt emergency measures to contain the virus such as the restrictition of general public mobility and strengthening border control or closing the borders. The governments of Italy, Spain and France have taken the most restrictive measures thus far.

In addition to having caused a major health crisis, this situation has had negative consequences for the global economy. According to the International Monetary Fund (IMF), the quantification of the economic impact of the new coronavirus pandemic is complex, generating uncertainty about the economic outlook and the associated risk of deterioration. This may jeopardize both economic growth and financial stability.

As the IMF notes, in addition to economic and fiscal measures, the implementation of monetary and financial stability measures will be critical to support the world economy . Hence, governments as well as national (e.g. BoE, Fed) and supranational institutions (e.g. ECB, EBA, ESMA) are taking measures to reduce the negative impact in the real economy, such as the suspension of mortgage payments, flexibility in the deferral of payments for SMEs and self-employed workers, or the increased flexibility of certain supervisory requirements, amongst others. This sort of measures are taken in different degrees in Europe, USA and Latin America.

Finally, the health threat of the spread of the new virus as well as the containment measures taken by the authorities pose a threat to the business continuity of companies.

The sharp decrease of the demand of products and services due to the restriction of general public mobility and the closing of businesses leads to liquidity stress for companies. Some sectors supply chains are also being seriously affected. Furthermore, the compliance with confinement measures implies a higher pressure on the telecommunications infrastructure, linked to the challenge that poses the implementation of teleworking for a big share of the workforce. Additionally, companies are implementing measures to mitigate the threats to the health of their employees.

In order to face this adverse scenario and ensure business continuity, companies must carry out and coordinate action plans on multiple fronts (HR and Organization, Technology, Facilities, Supplies and Communication) under a governance model that helps manage the crisis.

The paper gives an overview of the measures taken by institutions, with focus on Europe and America, as well as the impact that these will have in different sectors and in particular, the financial sector. The main objective of the paper is to present specific proposals for action to facilitate the management of the crisis and ensure business continuity of companies.

COVID-19: reactivation plan

This past month, as the pandemic has stabilized and been alleviated in some regions, several countries have drawn up, or are in the midst of drawing up, action plans to gradually reduce their restrictions on the freedom of movement and allow a cautious and gradual return to activity.

Such plans should contemplate the possibility of new waves of infection, the intensity of which will depend on how much of the current population is now immune (amongst other factors).

Generally speaking, WHO's recommendations, specified by geographical location, indicate the need to meet certain prior conditioning factors before commencing the reactivation phase, such as a continued fall in new cases, recovery of the healthcare system in order to provide adequate assistance, and national capacity to test, trace and speedily isolate infected persons. Furthermore, it is requested that the population be duly informed and act responsibly in a continued manner.

At the same time as governments are launching reactivation plans, companies are also in the midst of defining their own return plans, adapted by geographical location, activity sector and capacity to implement the health & safety conditions


decreed by the government. In turn, given the potential reappearance of a possible outbreak, a corporate reactivation plan should be adaptable and sequential, allowing the measures to be re-evaluated at each phase.

Finally, the economic and social scenario facing the business sector will be totally different from the one existing prior to the crisis.

▸ From an economic and political point of view, economic agents will be facing an unprecedented drop in GDP and a rise in unemployment, a fall in prices, market volatility and a possible wave of M&As. In some cases, governments may act through price intervention in some sectors or by reinforcing local production, if considered strategic to ensure self-sufficiency in new crisis situations (such as healthcare, food and energy self-sufficiency).

Commitment to the industry

FinRegAlerts, Management Solution's financial regulatory alerts app
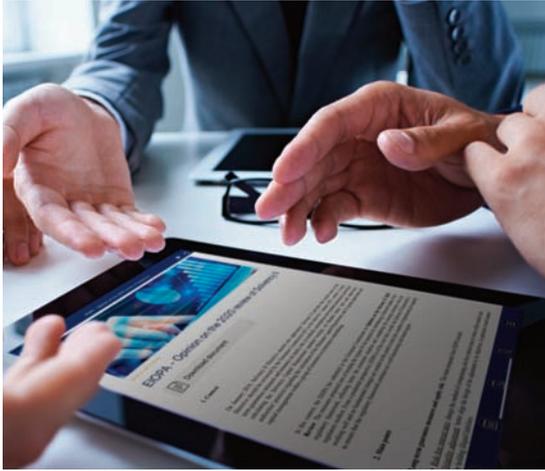
Since 2018, Management Solutions' financial regulatory alerts service was renewed through the launch of FinRegAlerts, an app for mobile devices developed by Management Solutions to monitor financial regulatory alerts issued by international, European and local regulators (United States, United Kingdom or Spain).

FinRegAlerts currently includes access to the following contents:

▶ **Publication alerts:** summaries of documents published by international regulators (BCBS, FSB, etc.) and European regulators (European Commission, ECB, EBA, etc.), as well as summaries of documents published at local level (United States, United Kingdom or Spain).

▶ **Quarterly and yearly regulatory outlooks:** reports that collect publication alerts and anticipate key regulatory changes.

▶ **Technical notes:** summaries containing details of regulations that have a major impact on or hold the greatest interest for the financial industry.

The app is available for free download from major application stores.

▶ From a social point of view, all companies should reflect on which changes in the market, new customer behaviour and customer relations will be permanent, in order to adapt their strategy and value creation policy.

▶ In addition, risk management should be strengthened in order to adapt to new surroundings with a higher rate of default, illiquidity and debt moratoriums in vulnerable sectors. The following sections seek to provide an overview for a reactivation strategy, offering specific action proposals for it to take place in an orderly and safe manner; we have examined the factors affecting such strategy, the conditioning elements in terms of human, technological and physical resources, and the associated logistics.

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affecting such strategy, the conditioning elements in terms of human, technological and physical resources, and the associated logistics.

Macroeconomic outlook reports

Management Solutions continuously monitors developments related to the key macroeconomic indicators for the economies in which the Firm operates so that the Firm can draw conclusions on expected developments for the future..

This monitoring activity is reflected in our quarterly "Macroeconomic Outlook Report", a document that also provides insight into the key indicators affecting the industries in which Financial Institutions operate (Banking and Insurance), and the Energy and Telecommunications industries.

Regulatory notes

As a firm providing professional consulting services for regulated industries, Management Solutions specifically monitors the regulatory environment affecting the industries in which it operates. On a weekly and quarterly basis, the Firm tracks major regulatory developments in the industries to which it provides advice, and compiles technical notes on regulatory developments that will have the greatest impact on those industries. Regulatory notes seek to summarize the rule, put it into context and explain some of its potential impacts.

During 2020, Management Solutions prepared 8 technical briefs on the most relevant regulations published by leading authorities.

Organization and participation in specialized conferences and seminars

Management Solutions participated as a guest speaker at the Grupo CERO plenary session, virtual event

Management Solutions took part at the plenary session of Grupo CERO (Spanish Operational Risk Consortium) to share the new developments introduced in the latest Basel Committee publications to more than 25 operational risk managers from Spain's top financial institutions.

The Firm presented the news introduced in the latest Basel Committee publications on the Principles for effective management of Operational Risk (PSMOR) and the principles for Operational Resilience.

Grupo CERO is a forum for major Spanish financial institutions to exchange experiences on Operational Risk management.

"The Governance of Analytical Models: A New Challenge for CDOs" webinar, virtual event

The Firm participated as a speaker and moderator in the "The Governance of Analytical Models: A New Challenge for CDOs" webinar, by the CDOs Club. CDO Club Spain is a forum involving more than 80 Chief Data Officers and data managers from Spanish companies in the financial, insurance, energy, telecommunications, construction, tourism, retail and other industries.

During the event, which was attended by more than 60 CDO's, Management Solutions presented the findings of a survey conducted on CDO Club members across industries to assess the current status, trends and best practices regarding model governance, and moderated a discussion on the matter.

"Security and self-service: new challenges in the age of data democratization", Spanish CDO club

Management Solutions has once again participated as a speaker in one of the events organized by the Club, demonstrating its extensive experience in the area of data governance and data quality and its knowledge of best market practices.

During the event entitled "Security and self-service: new challenges in the age of data democratization", the Firm described its extensive experience and knowledge of the enterprise use of own data, presenting a cross-industry benchmark and moderating the debate.

"Flattening the climate risk curve" webinar, virtual event

Management Solutions participated in the webinar "Flattening the climate risk curve", organized by IFC -International Finance Corporation-GBAC, of the World Bank Group, as part of a series of webinars that, under the title "Ctrl + Alt + Delete: GREEN REBUILD", aim to enable opinion leaders from different fields to share their vision on the opportunity to rebuild a more sustainable world.

During the webinar, Mr. José María Roldán, President of AEB (Spanish Banking Association), Mr. Giorgio Trettenero Castro, Secretary General of FELABAN, and Ms. Soledad Díaz-Noriega, Partner at Management Solutions, discussed the current challenges involved in climate change risk management, focusing on how these should be embedded into banks' risk management strategy and frameworks.

The event, moderated by Ms. Marcela Ponce from IFC, was organized as part of the collaboration framework between Management Solutions and IFC - International Finance Corporation-GBAC for the delivery of courses and informative events on sustainable finance and climate change related risks.

We implement an ongoing program of outreach activities and participation in specialized forums

13th Annual Banking Credit Risk Management Summit, Austria

Commitment to the industry

Model Risk Management Masterclass organized by Risk.net, virtual event

Management Solutions participated as a speaker in a number of online training sessions on Model Risk Management (MRM) organized by Risk.net and aimed at representatives of international as well as local financial institutions in various countries.

Alongside with the Firm, Speakers from organizations such as AEGON, Royal Bank of Canada, Lloyds Banking Group or Yields.io participated in the Model Risk Masterclass to discuss key issues for the industry, including regulatory requirements on MRM, how to build a risk management model framework, latest trends in internal model validation or model risk applied to Machine Learning models, among others.

Management Solutions' presentation, entitled "Building a model risk management framework", reviewed MRM regulations and provided an outlook on their likely future evolution, while also discussing in detail the components of a model risk management framework: organization, governance, policies and procedures, inventory, data and MRM tools.

Risk Nordics 2020, virtual event

In addition to being one of the event's sponsors, Management Solutions gave a presentation at Risk Nordics, a major industry event in the Nordic countries that was attended by more than 100 risk management leaders from the top financial institutions and insurance companies in the region, as well as European and local regulators.

The event, which aimed to address key risk issues for firms in the Nordic region, brought together the top financial and insurance industry players in the Nordic and Baltic countries for two days, as well as European regulators such as the EBA and the ECB.

Management Solutions presentation was entitled "Responding to Increasing Risk Data Expectations for Quality, Granularity, Governance and Control" and reviewed the main regulatory requirements and industry best practices on data granularity, data control and data quality within the financial and insurance industries.

13th Annual Banking Credit Risk Management Summit, Austria

Management solutions sponsored and delivered a presentation at the 13h Annual Banking Credit Risk Management Summit in Vienna (Austria), attended by representatives from major local and international financial institutions with a presence in the country.

The congress was attended by representatives from institutions such as Unicredit, ING, Credit Suisse, Nordea, etc. Attendees had the opportunity to discuss key issues for the industry such as the challenges and implications of credit risk management, IFRS 9, the new regulation for AIRB models, how to define and develop an adequate risk appetite framework, the main challenges in stress testing, and major innovations associated with credit risk management digitization.

Management Solutions' presentation, entitled "Model risk management – an industry review", reviewed the latest trends in model risk management, going beyond best practice in European and US banks and raising a discussion on issues still unresolved in relation to this subject, such as the management of the risk implied in the use of artificial intelligence models or the quantification of model risk, among others.

"Cybersecurity in the insurance sector" webinar, virtual event

Management Solutions organized a webinar to share the main cybersecurity risks and trends affecting the Latin American insurance sector. The webinar was attended by members of the CNSF, AMIS, the Superintendencia Financiera de Colombia, Fasecolda and more than 30 insurers.

During the seminar, Management Solutions shared its experience in cybersecurity risk management, focusing on the main threats and impacts for the insurance sector as a result of technological evolution, the concerns and demands of regulators, best market practices and the elements that define a Comprehensive Cybersecurity Risk Control Framework.

FELABAN´s 54th Annual Assembly, virtual event

Management Solutions participated in a panel discussion on the opportunities that sustainable recovery is likely to bring to Latin American banks. This major event was held as part of FELABAN´s 54th Annual Assembly and brought together the top leaders from Latin America´s financial sector.

FELABAN (Latin American Banks Federation) held its three-day Annual Assembly online on this occasion, providing ample opportunity for leading professionals from the Latin American financial sector to discuss and analyze major trends and topics concerning the sector.

Management Solutions participated in a discussion panel, moderated by the World Bank Group's International Finance Corporation (IFC), during which panellists discussed the latest trends in sustainable finance, the impact of climate change risks on the banking sector, and the potential opportunities a green recovery is likely to open up for Latin American banks. The panel featured more than 500 professionals from the financial sector.

As well as Soledad Díaz Noriega (Partner at Management Solutions), the panel also included Ms. Alzbeta Klein (Global Head of Climate Business at IFC World Bank Group), Mr. Aniceto Huertas (Partner and Co-CEO of Beel Infrastructure Partners), Ms. Gracia Barahona (Director of Ecobanking Project) and Mr. Carlos Serrano (Senior Operations Officer Climate Business at IFC). It was moderated by Ms. Marcela Ponce (Climate Finance Lead at IFC) and Mr. Luis Maldonado (Program Manager at IFC Green Banking Academy).

22nd Asobancaria Treasury Congress, Colombia

Management Solutions participated in the 22nd Treasury Congress on"Transformation, Challenges and Market Opportunities" organized by Asobancaria, the Association of Banks of Colombia, in Cartagena de Indias.

Management Solutions' presentation discussed Digital Transformation and deepened into the opportunities and challenges posed to treasury management by technologies such as Blockchain, Big Data, Machine Learning, Cloud and APIs.

"Evolution of pricing models in the insurance sector" webinar, virtual event

Management Solutions organized a webinar, together with Addactis, in order to share with the Latin American insurance sector the implications and experience of modeling the pricing of General Insurance products, with over 350 attendees.

During the seminar, experts from Management Solutions and Addactis shared trends in the sophistication of models and new techniques used in the pricing of Non-Life Insurance (car, home, health, etc.), complemented by a success case study of a Latin American insurer through the Addactis® Pricing tool.

"Salesforce in insurance - more sales and better customer experience" webinar, virtual event

Management Solutions joined efforts with Salesforce to organize the webinar "Salesforce in insurance - more sales and better customer experience", attended by firms from Mexico, Peru, Colombia, Chile, Argentina, Panama and Brazil, in collaboration with the Mexican Association of Insurance Institutions (AMIS).

During the webinar, experts from Management Solutions and Salesforce discussed the current context as well as the importance of having tools that help boost sales and improve the customer experience, presenting the different cloud platforms offered by Salesforce and covering the entire insurance value chain, from when a policy is purchased to when a claim is processed.

"Data Office implementation and evolution in the insurance sector" webinar, virtual event

Management Solutions has hosted a webinar for the Latin American insurance sector on implementing and evolving a Data Office, with the participation of 180 people from more than 50 insurance companies in over 10 countries.

During the session, which on this occasion focused on Data Governance and Data Quality, Management Solutions provided an overview of the industry situation in terms of Data Office development and implementation, the scope of activities carried out by these offices as well as their deployment models.

"Climate Risk Management in the insurance sector" webinar, virtual event

Management Solutions organized a webinar for the Latin American insurance sector to share the keys to managing

Commitment to the industry

Risk conference organized by the Associação Brasileira de Bancos, Brazil

climate change risk, with the participation of the World Bank – IFC.

During the session, held virtually given the global COVID-19 situation with the participation of 160 people from more than more than 50 insurance companies in over 10 countries, Management Solutions shared the current regulatory environment and key initiatives at the international level, as well as the main methodological milestones in the measurement of climate change risk and best practices in climate change risk management.

The webinar also featured a presentation by Ms. Marcela Ponce, Climate Finance Lead for Latin America Caribbean at International Financial Corporation (IFC) – an entity in the World Bank Group with which Management Solutions collaborates in a partnership to deliver training in Sustainable Finance and Climate Change related Risks.

"IFRS 17 in Action in Latin America – a Practical Implementation of Contract Measurement under the General Model (BBA)" webinar, virtual event

Together with Moody`s Analytics, Management Solutions organized the webinar "IFRS 17 in Action in Latin America – a Practical Implementation of Contract Measurement under the General Model (BBA)", which was attended by more than 150 industry professionals from more than 10 Latin American countries.

During the webinar, a case study was presented covering the complete IFRS 17 process for contracts measured under the general model (BBA), with a focus on the following aspects:

▸ Description of the general calculation process under the general model (BBA).
▸ Allocation of contracts to units of account.
▸ Initial PVFCF, RA and CSM and subsequent reassessment.

▸ Changes in liabilities through several successive reporting periods, and tracking of unit of account profitability.
▸ Recognition in the financial statements, P&L analysis and generation of daily debit and credit entries.

"Implications of adapting to IFRS 17 in Central America" webinar, virtual event

Management Solutions organized an informative webinar, held virtually due to the current global situation caused by COVID-19, with the Panamanian, Salvadoran and Costa Rican insurance sector in which representatives of 40 insurance entities participated.

The Firm shared the impact of the latest amendments published by the AISB, the key methodology aspects for discussion, and the lessons learned in implementation processes that are at an advanced stage and can help companies currently at an initial stage of IFRS 17 implementation.

Webinar with the Risk Management Club of the Dominican Republic, virtual event

Management Solutions participated in an informative session, held virtually due to COVID-19, that was organized by the Risk Management Club of the Dominican Republic and featured the participation of representatives of the country's main financial institutions.

Management Solutions' presentation was entitled "Risk management challenges in the COVID-19 environment" and shared the most relevant regulatory issues in the current context, the associated stress testing exercises and scenarios, and the issues related to the risk appetite framework.

"Transposition of BIS III capital regulations to brokerage houses" webinar, virtual event

Management Solutions participated in the webinar "Transposition of BIS III capital regulations to brokerage

houses", aimed at all members of the Mexican Association of Stock Market Institutions (AMIB). The seminar discussed the main economic and operational implications of the potential changes in capital rules for brokerage houses (currently under Basel I) to Basel III regulations.

The session reviewed the different methodologies for the calculation of risk-weighted assets and the main difficulties faced by Mexican financial institutions in 2016, when the capital rules evolved from Basel II to Basel III, with the particularities of the Mexican regulations.

Virtual seminar on climate risk and business continuity plans at the ABM, virtual event

Management Solutions gave a "Climate risk in business continuity plans" seminar that was attended by 300 people, all of them risk management professionals in Mexico.

The seminar, aimed at all ABM members, discussed the importance of factoring in climate risk in banks´ business continuity plans, with a special focus on the new types of risks to be considered, taxonomy of affected assets, scenario methodology and impact measurement. The seminar also stressed the importance of transferring these scenarios to the origination, loan investment analysis and monitoring processes as a tool for loss mitigation and identification of new business scenarios and opportunities.

10th International Risk Management Congress, virtual event

Management Solutions participated in the "10th International Risk Management Congress" organized by FEBRABAN (Federação Brasileira de Bancos). The goal was to share the views of regulators, financial institutions and professional services firms on aspects related to the latest trends and challenges in risk management for financial institutions.

In addition to being one of the sponsors, Management Solutions participated with the presentation "Climate Risk Management", by Ms. Soledad Díaz-Noriega, that looked into the main challenges and best current practices on Climate Risk based on the Firm's international experience. Other speakers included Mr. Anup Jagwani (Manager for Climate Finance and Policy at IFC - International Finance Corporation/World Bank) and Ms. Kathleen Krause (Deputy for the Prudential and Exchange Regulation Department at BACEN).

The Congress, the leading one about Risk Management in Brazil, took place on a virtual format due to the circumstances arising from the COVID-19 pandemic, and was attended by representatives of the regulator and some of the main financial firms in Brazil and the world.

"COVID-19 risk scenario assessment" webinar, virtual event

Management Solutions participated as a speaker in a webinar organized by ABBC (Brazilian Association of Banks) to share its vision with the Brazilian banking sector, both nationally and internationally, as well as its vision on the management and control of credit risk , the mitigation of impacts on NPLs, Provisions and Capital, and the development of scenario projections for the current global COVID-19 situation.

This initiative is part of a series of events that ABBC, which with the support of Management Solutions, organizes with the aim of discussing different national and international hot topics affecting the banking sector.

Santander Brazil Finance Datathon, virtual event

Management Solutions participated as a speaker in a Datathon organized by Santander in Brazil in which all of the unit's Finance teams participated, including its Senior Management.

The event approached the resolution of real database challenges, focusing on data quality, and included presentations by experts in the field. Management Solutions' presentation was entitled "Qualidade dos dados" and shared Management Solutions' experience in Governance & Data Quality with the Datathon participants, supporting the teams and offering solutions to the proposed challenges.

Risk conference organized by the Associação Brasileira de Bancos, Brazil

Management Solutions participated as a guest speaker at a conference on risks organized by the Associação Brasileira de Bancos (ABBC) in São Paulo and attended by representatives of local and international finance institutions.

The conference aimed to share with members the difficulties of implementing IFRS 9 and the challenges of embedding it in risk management. Management Solutions' presentation shared the Firm's experience in IFRS 9 implementation, both locally and internationally, focusing on the potential challenges of embedding IFRS 9 in the risk management process.

"Model Risk Management: Better Decisions Based on Analytical Models" webinar, virtual event

Management Solutions participated as a guest speaker at a webinar organized by GARP (Global Association of Risk Professionals) in Peru that was attended by 150 professionals from the risk sector in the region.

Management Solutions' presentation reviewed current international regulations on MRM and likely future changes, taking a detailed look at the key elements required for defining and implementing a comprehensive MRM framework in the region, as well as the challenge of adapting to the most innovative Machine Learning and AI techniques.

Commitment to the industry

After the presentation, Management Solutions had the opportunity to participate in a panel discussion with representatives of the Banks Association as well as the Banking, Insurance and AFP Superintendency and Scotiabank Peru.

Seminar on asset and liability management, virtual event

Peru's Banking, Insurance and Private Pension Fund Managers Superintendency trusted Management Solutions to deliver a seminar on asset and liability management for their employees. During the 20-hour seminar, that was held virtually, the theoretical foundations of asset and liability management in insurance entities were addressed, complemented by highly complex case studies.

2020 Fasecolda International Insurance Convention, virtual event

Management Solutions participated as a sponsor in the Insurance sector event organized by the Federation of Colombian Insurers (Fasecolda), which was attended by representatives across the Colombian insurance sector.

The event was attended by different guest speakers and insurance sector experts such as Mr. Miguel Gómez (President of Fasecolda), Mr. Javier Suárez (Chairman of the Board of Directors of Fasecolda and Seguros Bolívar), Mr. Jorge Castaño (Superintendent of Colombia's Financial Superintendency), Mr. Alberto Carrasquilla (Minister of Finance and Public Credit), as well as the President of the Republic of Colombia, Mr. Iván Duque, who closed the event.

Some of the topics addressed during the three-day convention were the current situation and prospects for economic recovery in the face of the pandemic, the imminent electoral processes in the United States and Latin America, and the key challenges and supervisory trends facing the insurance industry in the future.

"Convergence of IFRS 17 regulations in Colombia" webinar, virtual event

Management Solutions participated as a guest speaker in the virtual seminar "Convergence of IFRS 17 regulations in Colombia", organized by SAS for the Colombian insurance sector.

During the event, the main methodological and operational aspects of the implementation of the new IFRS 17 regulations in the Colombian insurance market were reviewed.

Webinar on IFRS 17 in Chile, virtual event

Management Solutions organized a webinar to share the latest IFRS 17 developments and topics of discussion with the Chilean insurance sector, with 20 companies in the Chilean insurance sector.

The Firm shared the impact of the latest amendments published by the AISB, the key methodology aspects for discussion, and the lessons learned in implementation processes that are at an advanced stage and can help companies currently at an initial stage of IFRS 17 implementation.

"Basel III in Chile - The Road to Regulatory Compliance" webinar, virtual event

Management Solutions participated as a speaker at the webinar "Basel III in Chile – The road to regulatory compliance", an event aimed at local and international financial institutions that was addressed by speakers from the Association of Banks of Chile (ABIF) and Moody's Analytics. The webinar discussed the challenges faced by the industry in adapting to Basel.

Management Solutions' presentation was entitled "Basel III key aspects and deliverables", and reviewed the challenges of Basel III implementation in the industry.

"Model Risk Management in Banking", Reino Unido

Management Solutions sponsored and participated as a speaker in a Model Risk Management in Banking conference in London, organized with the aim of sharing key trends in model risk management and assessing the effectiveness that both Artificial Intelligence and Machine Learning can add to model management.

The event, of which Management Solutions was the main sponsor, was attended by representatives from institutions such as the Bank of England, Santander, Société Générale, Bank of America, HSBC, UBS and Barclays, among others.

Management Solutions' presentation, entitled "Model risk: Myths debunked and burning trends", aimed to share the Firm's experience in MRM (subject matter of a white paper published by Management Solutions) as well as current trends in model risk management.

"Risques de Modèle, Mythes et tendances", France

Management Solutions sponsored and participated as a speaker in the "Risques de Modèle, Mythes et tendances" conference organized by Revue Banque in Paris, attended by representatives from international financial institutions.

The event, of which Management Solutions was the main sponsor, was organized with the aim of sharing key trends in model risk management and assessing the effectiveness that both Artificial Intelligence and Machine Learning can add to model management. The conference, moderated by Management Solutions, was attended by representatives from institutions such as Banque de France, Société Générale, BNP Paribas and ABN Amro.

Management Solutions' presentation entitled "Model risk: Myths debunked and burning trends", aimed to share the Firm's experience in MRM (subject matter of a white paper published by Management Solutions) as well as current trends in model risk management.

"Governing Big Data: Challenges and Key Factors to Success", USA

Management Solutions organized a discussion forum for CDOs in New York, which was attended by a number of professionals from top financial institutions.

Under the title "Governing Big Data: Challenges and Key Factors to Success", attendees were able to discuss the challenges and keys to successfully implementing Data Governance strategies in Big Data environments, a critical issue for the industry given the exponential growth in the sources, nature, volume and uses of the information utilized by financial institutions for strategic development.

The forum focused on the evolution of Big Data environments from a project (siloed) approach to a Data Lake integration approach, including the need to create an enterprise-wide harmonized logical data model that will ensure the information can be properly understood and updated so it can later be used to its full potential. Other issues discussed included Data Lake hosting approaches, the best approaches to install reporting layers in or on the Data Lakes, and alternatives to support business cases that will allow the CDO areas to obtain the significant investment required to build a data governance model in these environments.

"Our deep sectoral knowledge helps to develop differential value propositions for our clients"

This specialization allows us to anticipate clear answers to key challenges for the different industries in which we work.

We are firmly committed to sharing our sectoral knowledge. This is why we have a selective presence in major industry forums in the countries where we operate, organize webinars on industrials trends, and publish specialized studies on relevant issues for each industry.

We also seek to transfer best practices between industries, identifying issues that are better resolved in one industry than in another. All this is possible because we work for organizations that are leaders in their respective industries and geographies.

Rafael Guerra
Partner at Management Solutions