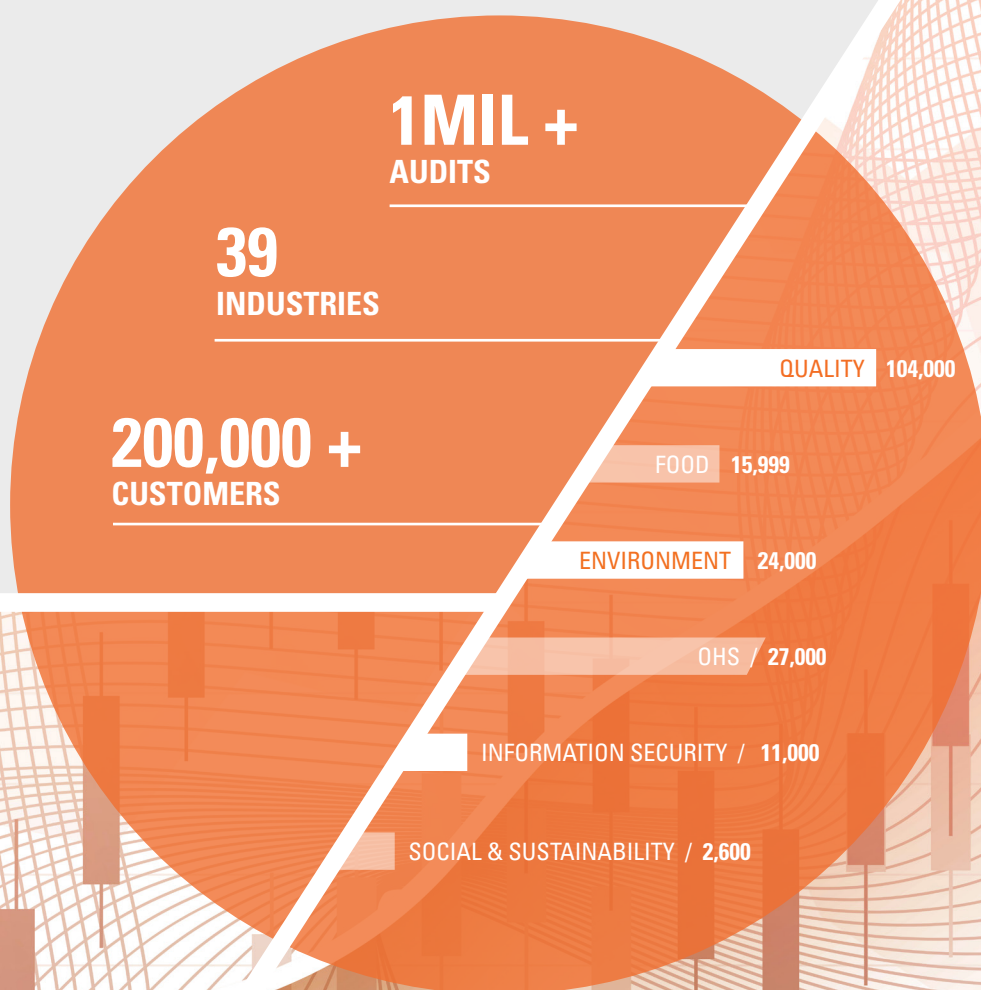


ACHIEVING BUSINESS ENHANCEMENT WITH DATA TRANSFORMATION



INTRODUCTION

Organizations are continually evolving to meet customer demands, disruptive market factors and technological advances. As the global leader in certification, SGS has been compiling audit data for decades, allowing us to develop immense expertise in the field and giving us a unique and unbiased perspective into key industry issues. The BE Engine has been developed to harness this data. It is a methodology and business intelligence tool that can be used to identify threats and their associated impact across a company's value chain. This approach to risk mitigation provides our clients with a competitive advantage in resource allocation, process efficiency and market responsiveness. In partnership with SGS our clients can become proactive; instead of just reacting to business and market fluctuations. It gives them the tools to mitigate risk, thereby reducing possible negative impacts on their bottom line and allowing them to achieve true Business Enhancement.

With certification and industry information for over 200,000 customers, relating to compliance, quality, environmental, and health and safety, we hold millions of data points. These span 39 industries and every country, giving us a unique perspective and expertise on various company risks.

Today we are perfectly positioned to harness real, historical compliance data and authentically developed business sector metrics, allowing us to move beyond the mundane financial benchmarking embraced by traditional business consulting services and enabling us to deliver true Business Enhancement to our partners, enabling our clients to **BE THE BENCHMARK**.



SGS: WHEN YOU NEED TO BE SURE

Established in 1878, SGS transformed grain trading in Europe by offering innovative agricultural inspection services. From our beginnings as a grain inspection house, we have steadily grown into our role as the world's leading testing, inspection, and certification service provider. This has been achieved through continual improvements and innovations, leading to reductions in risk and improved productivity. Our mission to provide assurance to our customers is encapsulated in our maxim, "When You Need to Be Sure".

Over the years, our clients' needs have evolved to meet technological advancements, globalization, and various market disruptions. Our services have evolved to match these changes. We have remained a vital and effective partner through our development of more holistic, performance-based solutions. Our industry experts and vast global network allow us to provide a service unlike anyone else, while still ensuring a hands-on, personalized approach to the needs of our clients.

INDUSTRY EXPERTISE

Our strategic partnerships with regulatory bodies ensure up-to-date knowledge and service for our clients. We Serve 39 Major Industries, including:



Agriculture
and Food



Chemical



Construction



Consumer
Goods & Retail



Energy



Industrial
Manufacturing



Life
Sciences



Mining



Oil & Gas



Public Sector



Transportation

BRIEF HISTORY OF ISO CERTIFICATION

In 1946, delegates from 25 countries met at London's Institute of Civil Engineers to consider the formation of the International Organization for Standards (ISO). It was proposed that the entity should, "facilitate the international co-ordination and unification of industrial standards". Starting in 1947 with 67 technical committees, ISO has grown considerably and today has 785 technical committees, members from 162 national standards bodies, and has published over 22,440 standards.



1951

ISO/R 1:1951 Standard reference temperature for industrial length measurements – first standard issued by ISO



1987

ISO 9000 Quality management – ISO's most well known and best selling family of standards



1996

ISO 14001 Environmental management



2010

ISO 26000 Social responsibility



2011

ISO 50001 Energy management



2018

ISO 45001:2018 Occupational health and safety management

INTRODUCING THE CERTIFICATION AND BUSINESS ENHANCEMENT SYSTEM

SGS has conducted audits for 200,000+ customers, raising millions of certification data points across 39 major industries. This information provides a clear indication of the common pain points faced by companies in these industries.

Such a vast dataset has provided us with an opportunity: we can use the insights from this data and combine that with our technical expertise to help our clients proactively identify business issues. Utilizing our robust foundation in certification and auditing, and the data drawn from this experience, we transformed our approach to include nonconformity analysis that allows us to identify trends and potential pitfalls.

Our service has evolved to include Business Enhancement solutions that focus on value added and continuous improvements for our clients. True Business Enhancement is only achieved when an organization evolves from simply reacting to business and market fluctuations, to proactively predicting and mitigating risks before they can negatively impact the bottom line.

Businesses have traditionally focused on the tangible, with decisions being made with reference to data that can be neatly placed in columns. Using this system, future business strategies are developed following a review of compliance with standards and/or financial bottom lines. By its very nature, this data is always limited in scope and is always representative of the past. There are three areas where problems can be manifested in this system:

- **DATA GENERATION AND COLLECTION** – sources and platform from which the data is captured
- **DATA AGGREGATION** – processes and platforms for combining data from multiple sources
- **DATA ANALYSIS** – gathering insights from the data, which can then be acted upon

The modern business environment is different; it is driven by data. Where it would have once been impossible to meaningfully focus on anything beyond compliance to the overall standard, we can now

DRIVERS:

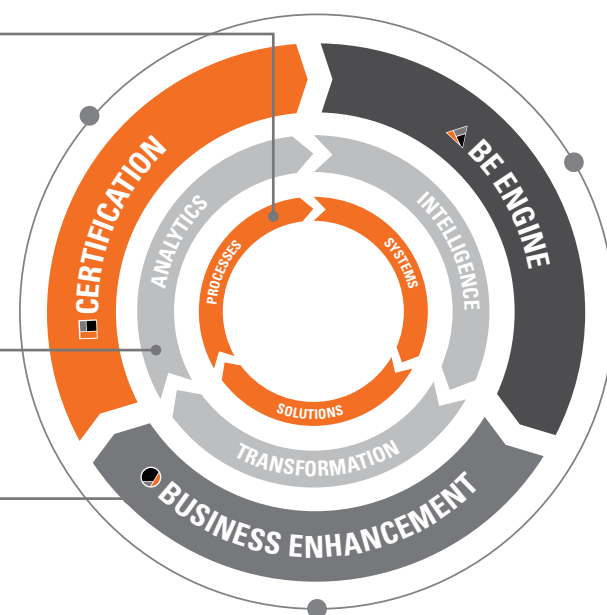
Data analysis designed to improve operational processes, implement effective management system, and drive business growth

TRANSFORMATION:

Using data from Certification audit nonconformities to generate insights regarding pain points and potential risks

IMPLEMENTATION:

Integrating products and services in Certification, BE Engine, and Business Enhancement



CBE SYSTEM ICONS



CERTIFICATION

The square indicates the foundation of our business, encompassing all Certification services. A stable and strong base for all our products and services.



BE ENGINE

The triangle signifies positive change which is an output of our BE Engine methodology and business intelligence tool.

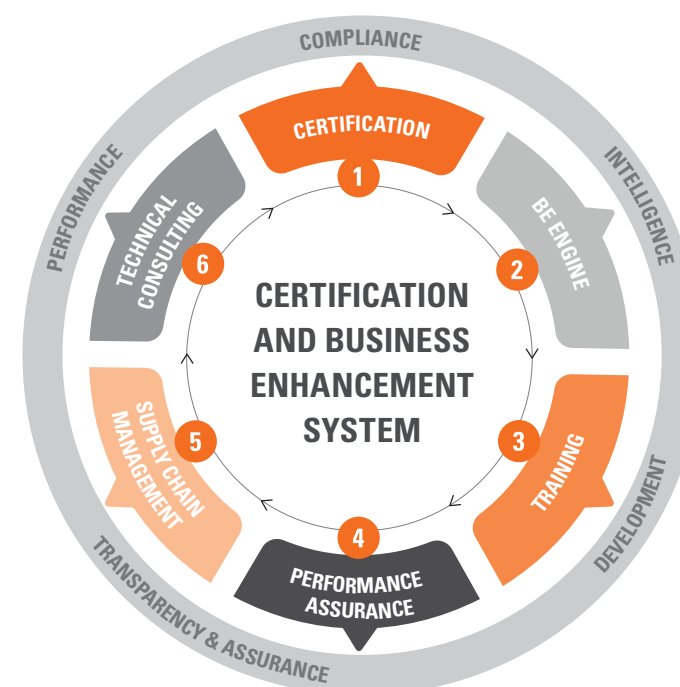


BUSINESS ENHANCEMENT

The circle signifies continuous positive business enhancement our services will enable and activate.

effectively manipulate data to consider compliance against each clause in a standard. Clauses and sub-clauses are the components that create a standard. These are the individual requirements against which compliance is judged. Decisions relating to conformity and non-conformity with a clause or sub-clause are unbiased because they do not require interpretation by the auditor. Depending on the industry or geographical region, the concept of compliance may vary, but it always operates as a valuable health check for the organization.

Analyzing non-conformity trends allows us to understand a variety of issues relating to systems, e.g. quality management or environmental management. Relying on a single piece of data, which may contain a hidden bias, can lead to conclusions that cannot be extrapolated across an entire industry. Compliance data allows us to remove these biases and, because the data being analyzed relates only to clause non-conformities, we are able to accurately identify gaps in processes and operations. The greater the amount of data being analyzed, the more useful it is in predicting future trends. This allows us to proactively identify future risks and recommend an appropriate solution. The lack of bias in the system means the solutions we recommend are true reflections of industrial requirements. At the same time, it also gives us the ability to create custom solutions for our clients, based on their data but cross-referenced with industry data.



BIG DATA AND THE TIC INDUSTRY – COMPETING IN A DATA-DRIVEN WORLD AND WHY WE NEED TO TRANSFORM

Big data and analytics are bringing major changes to the testing, inspection, and certification (TIC) industry. As the quantity and quality of data relating to tested and inspected objects grows, so does the need for data management and analysis.

Companies are now generating data at larger volumes, with high velocity, and with greater variety. This is transforming the TIC industry. We are no longer restricted to data that is sourced in traditional ways. In addition, we can introduce insights gained from different sources obtained from SGS database. Our ability to analyze this data, in an exponential way, means we can now achieve results and make predictions in real time.

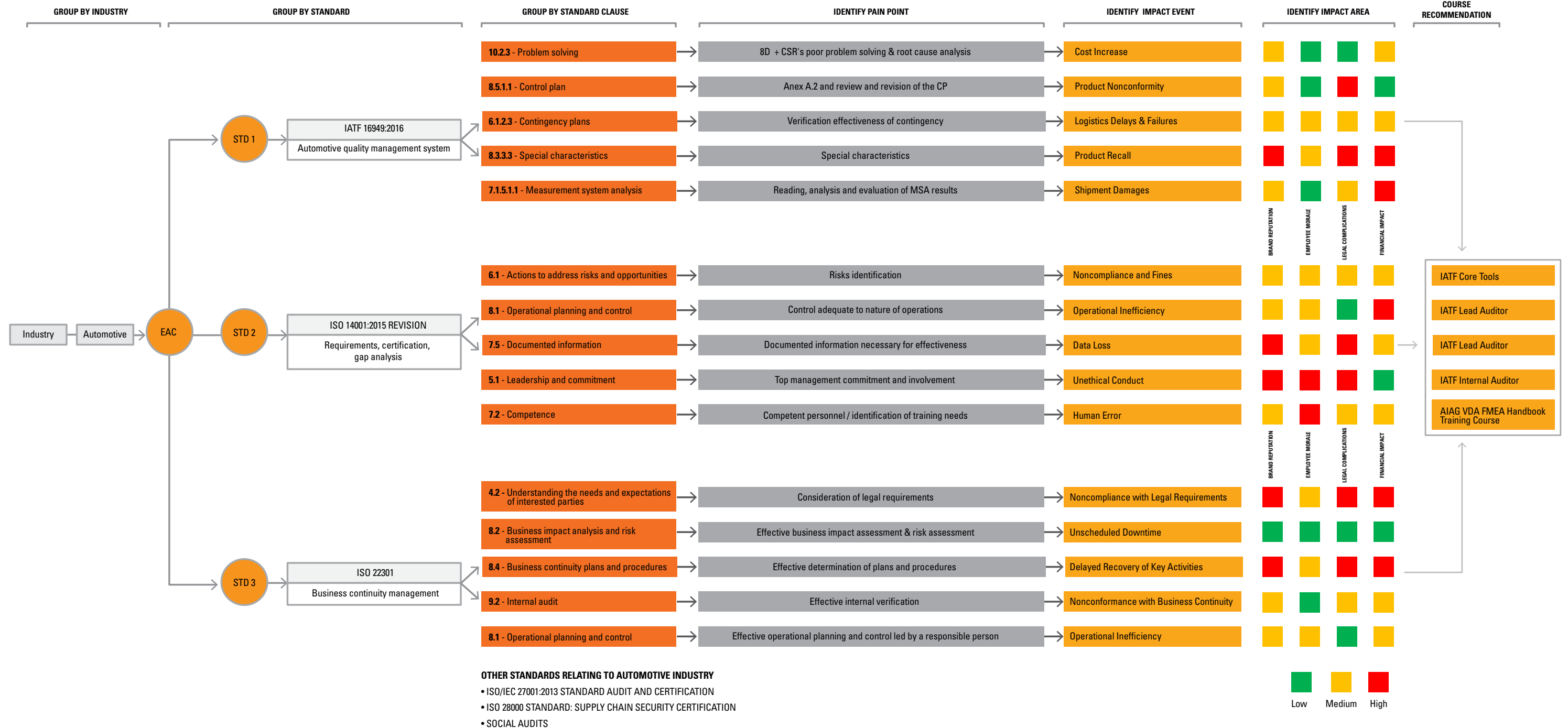
Big data and analytics enable better insights into existing services and they allow TIC providers to develop new solutions, including data-based services covering new areas. The utilization of big data by the TIC industry is allowing the following services to be developed and/or improved (classified according to the evolution in digitalization):

- **DATA SERVICES** – using the dataset that already exists: technical reviews, advice and consultations, knowledge repositories for customers, advanced performance monitoring, new customer-centric (personalized) services
- **DATA SCIENCE FOR THE CORE BUSINESS** – using data analytics and digitalization to develop services that promote business continuity: remote auditing, real time testing, mobile inspections
- **DATA BASED PRODUCTS** – including: data management platforms for industrial facilities, utilities, engineering and operation maintenance companies, manufacturers, etc., trust provision for checking rankings or validation systems, data quality control (traceability and veracity) using blockchain technology

Moving forward, big data and high level analytics will have a major effect on the way services are provided. The change is not only technological, it will also require a change in mindset and culture for organizations that wish to achieve true business enhancement.

DATA ANALYSIS METHODOLOGIES: INDUSTRY ANALYSIS PROCESS FLOW

EXAMPLE OF AUTOMOTIVE INDUSTRY



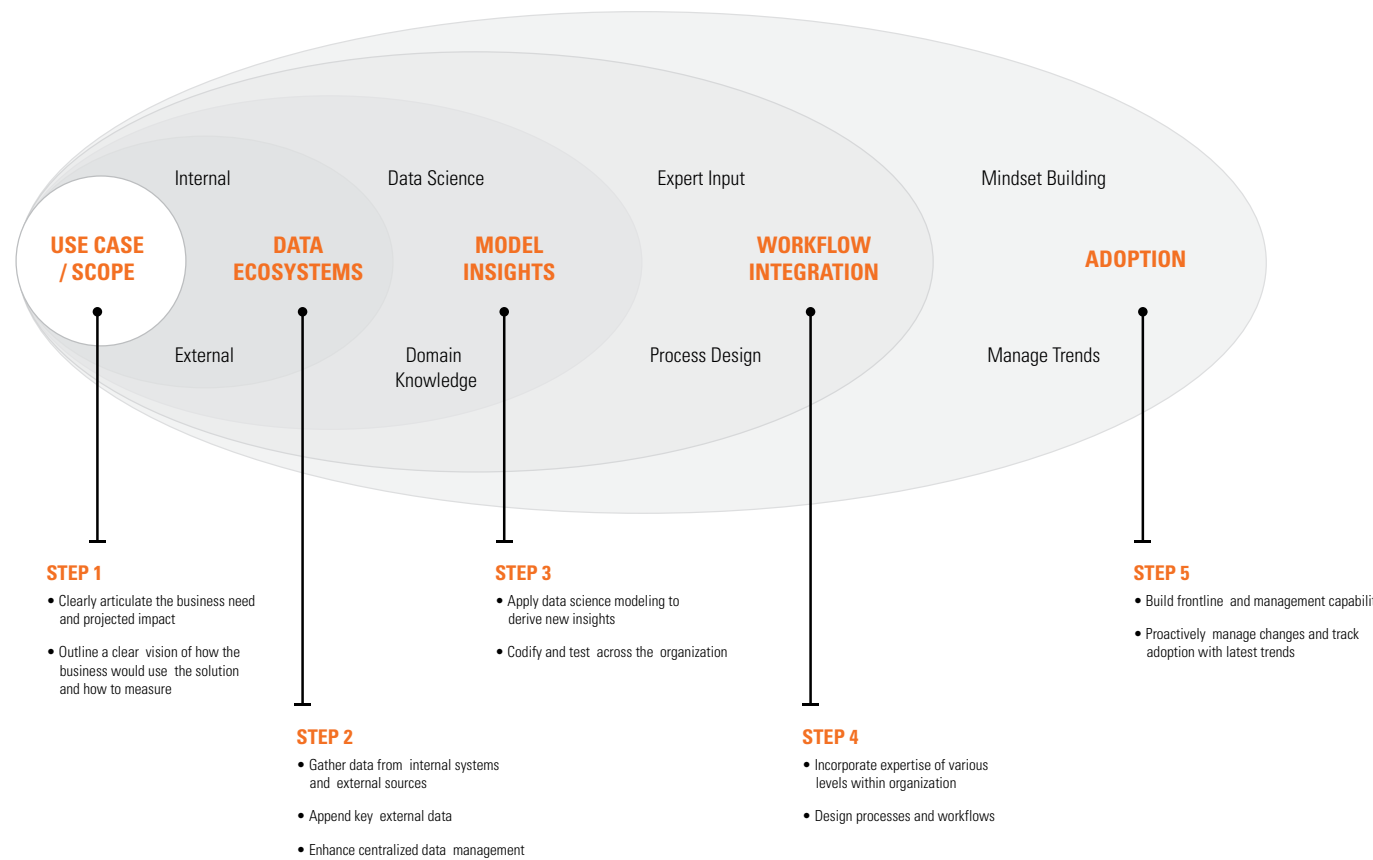
From industry audit data analysis to impact events and training courses identification, there are standard steps that should be taken. Within the industry to be analyzed, standards and clauses that hold the most nonconformities are first identified. The data insights generated during this process are then considered by experienced global product managers to validate root causes and determine a client's risk exposure. This can be broadly translated into client or industry needs, otherwise known as pain points. Each pain point is then linked to an impact event, a negative situation that can impact normal operations, and each event will be mapped to its impact area and impact level (low, medium, and high). The evaluation will then incorporate expert opinion from a variety of disciplines to ensure the right solutions are matched to the pain points and impact events. In effect, what is created is a tailormade Business Enhancement solution.



DATA TRANSFORMATION AND THE BE ENGINE

The BE Engine is SGS' data transformation methodology and business intelligence tool. Internal and external data collected by SGS over several years can be analyzed and transformed into meaningful insights.

An effective and successful data transformation strategy should be broken down into several steps.



SOURCE: McKinsey Analytics: The Age of Analytics: Competing in A Data-Driven World

STEP 1: USE CASES/SOURCES OF VALUE/ RESEARCH SUBJECTS

Ask fundamental questions that can shape the methodology vision: what will data and analytics be used for? how will the insights drive value? how will the value be measured?

It is important to know what answers are needed from the data and how it should be presented in relation to new or core services. The following sample research subjects are topics related to SGS and our clients' values. These insights can drive business value through enhanced risk assessment and management:

- Assessing plant heterogeneity and corporate performance – firms often operate more than one plant and yet certification is often performed individually. This question looks at variance in multisite performance, as it pertains to certification/compliance/non-compliance, and the relationship to corporate performance
- Assessing the link between compliance and performance – including the impact of factors that influence the relationship, e.g. type of standard, type of violation (minor/major), the area influenced or flagged in the violation
- Predicting non-compliance - assessing whether there are certain corporate/plant traits (e.g. size, industry, location, experience with the standard, financial stability) that are most often associated with non-compliance
- Exploring the pattern of non-compliance over time – to what extent is there stability in non-compliance?



STEP 2: BUILDING THE UNDERLYING DATA ARCHITECTURE, INCORPORATING DATA COLLECTION AND GENERATION CAPABILITIES

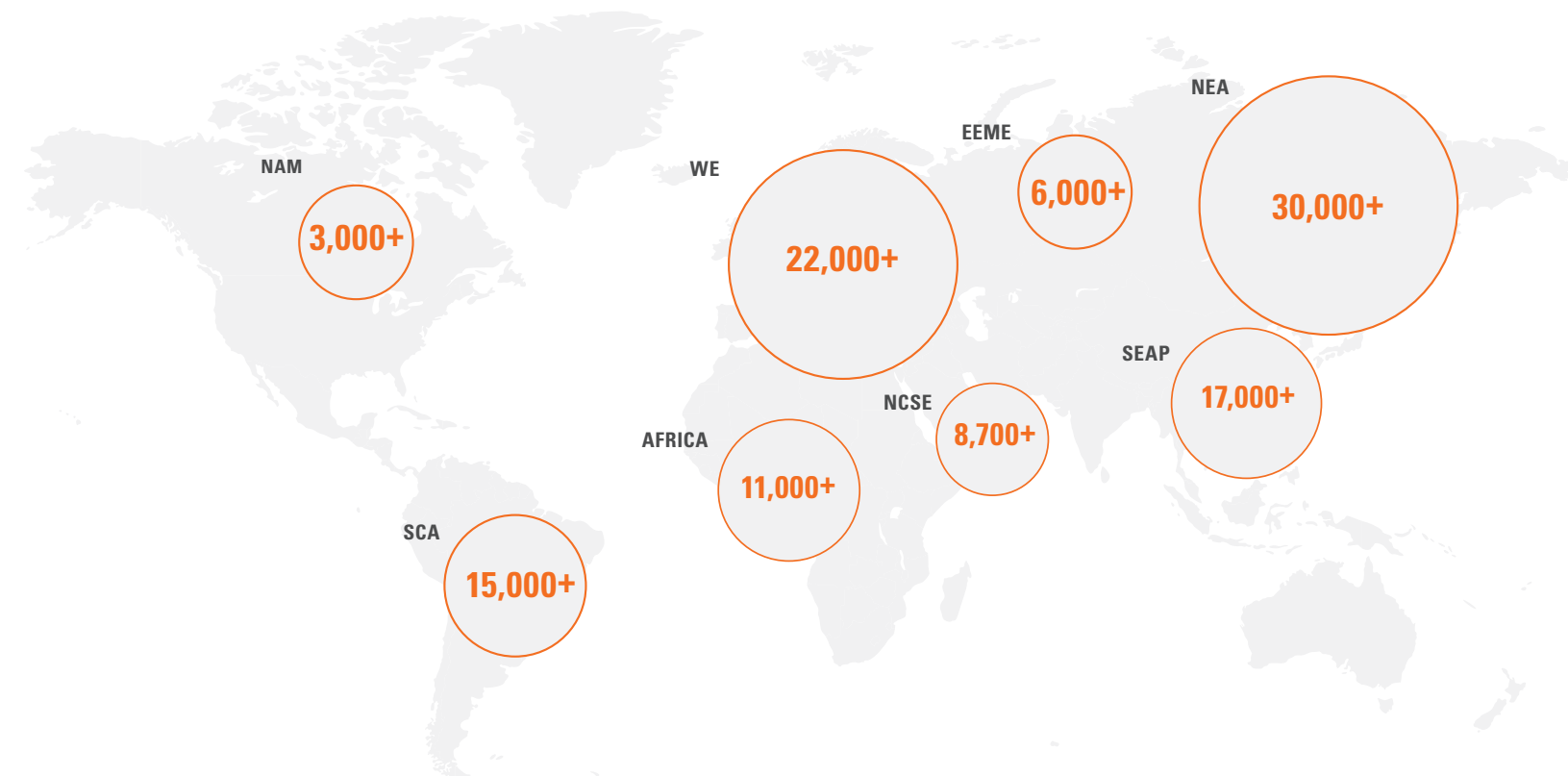
SGS AUDIT DATA SCOPE

Data has increasingly been a vital part of SGS' primary business strategy and a key operational focus. Since the 1980s, we have focused on collecting a comprehensive data set and confirming its integrity. Our vast body of data relating to certification and compliance now covers a wide variety of standards, industries and geographical regions.

THE SGS DIFFERENCE

With Certification and industry information relating to compliance, quality, environmental, and health and safety for over 200,000 customers, we hold millions of data points. These span 39 industries and all 89 countries, giving us a unique perspective and expertise on various company risks.

9 BUSINESSES | **89 COUNTRIES** | **200 CUSTOMERS** | **2,600 OFFICES** | **89,000 EMPLOYEES** | **2MIL+** INVESTED IN LOCAL COMMUNITIES WORLDWIDE (2019)

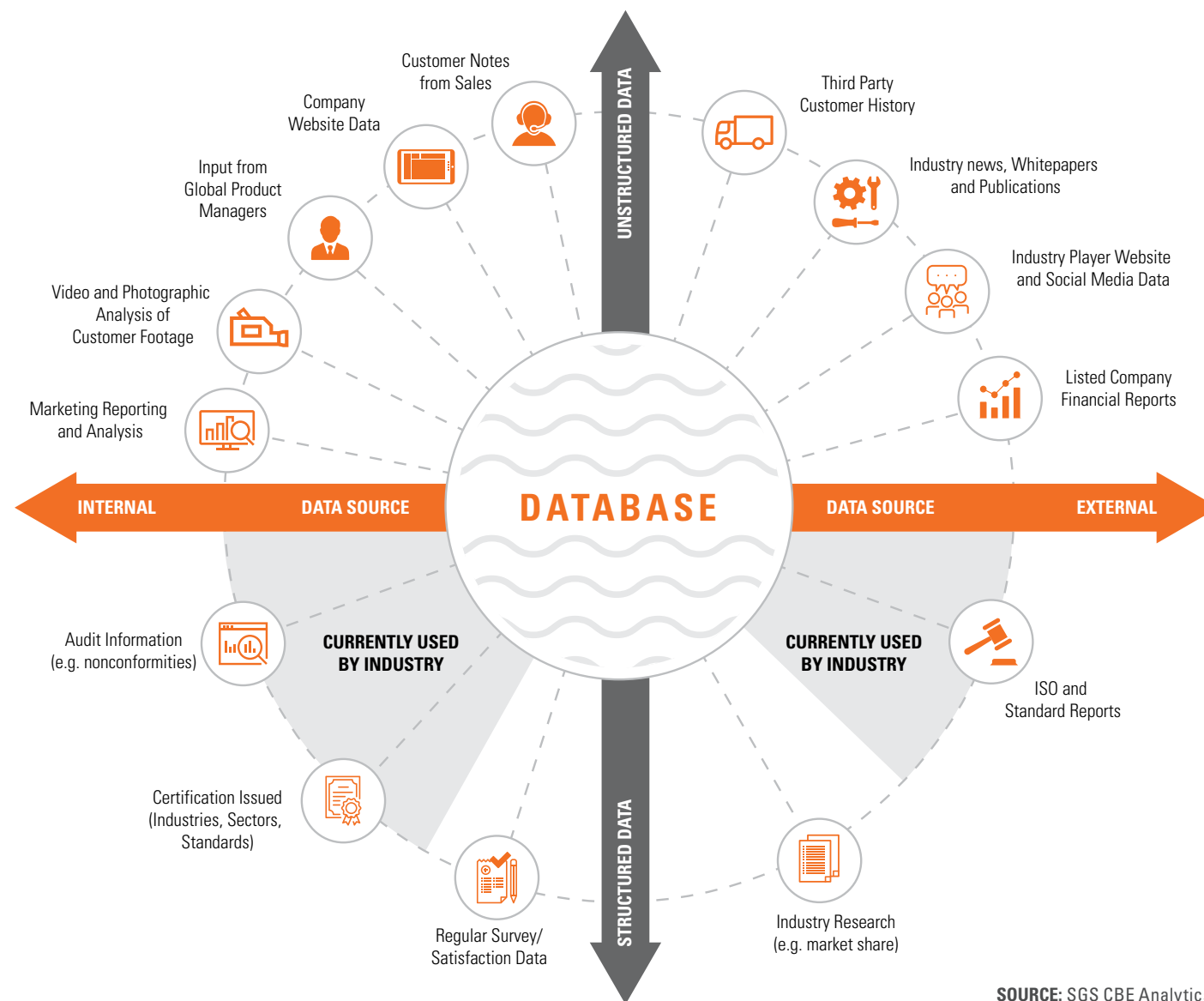




SGS DATA STRUCTURE

Massive data integration capabilities are valuable for industries because combining unstructured and structured data from multiple sources, including internal and external sources, enables better decision making. For example, apart from structured data (such as certification reports), unstructured input from external and internal sources can also be valuable when identifying opportunities and staying up to date on market and competitive trends.

SGS is dedicated to breaking data silos, combining traditional and new data sources.



Moving away from legacy data, the BE Engine has become a more nimble and flexible system that utilizes its architecture to store and harness big data. The SGS database integrates new sources of data as they become available—both structured and unstructured, and can tap an enormous range of potential new sources.

SGS has also implemented a comprehensive digitalization process that allows the collection of all useful data into a centralized data management system. This adds extra security, integrity, consistency and operational efficiency to the system, and is essential to building an effective and trustworthy data architecture.

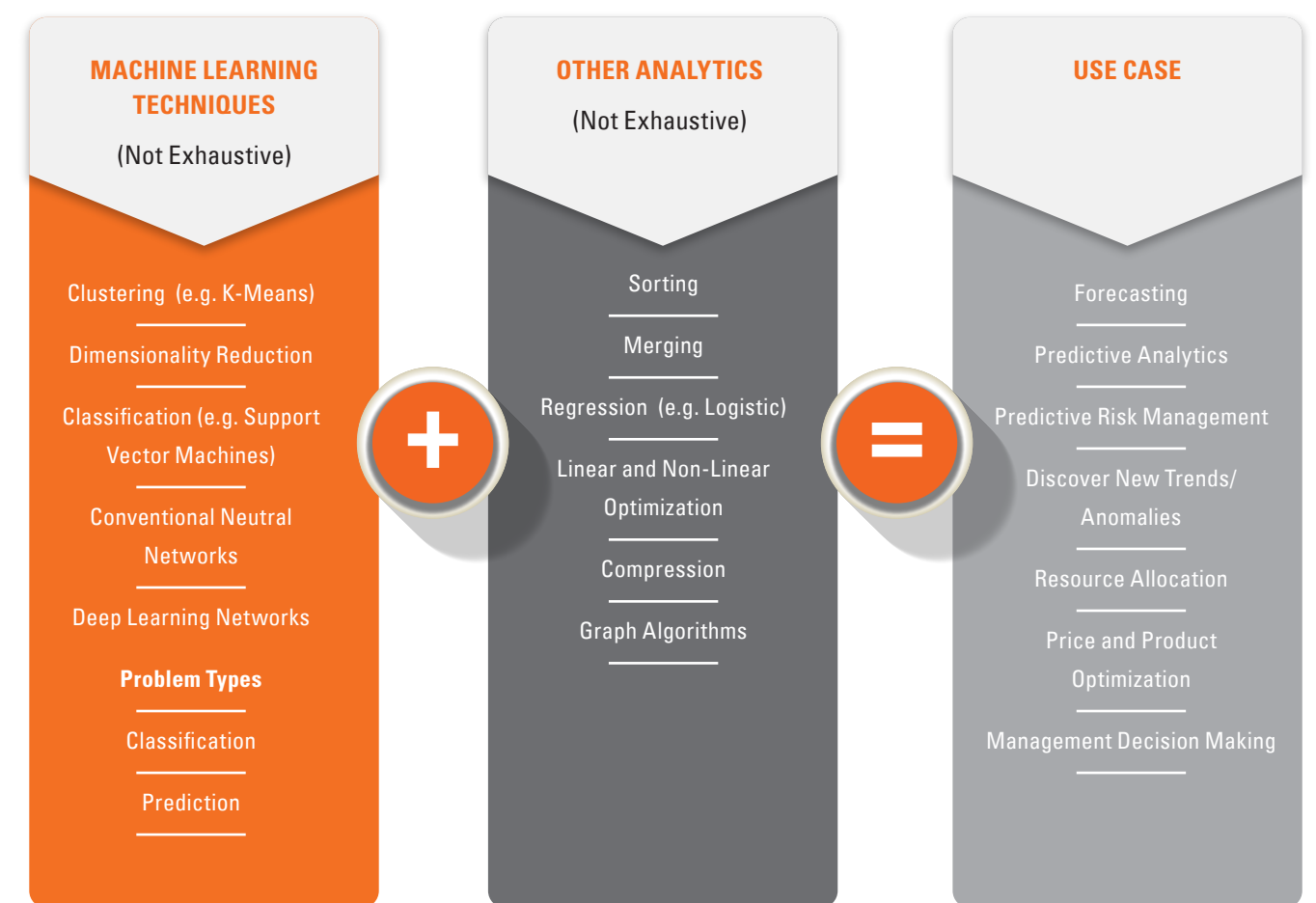


STEP 3: BUILDING ANALYTIC CAPABILITIES

Deriving insights requires a variety of talents, including data scientists and analysts. They facilitate the transformation of analytical data into practical and applicable business insights. This requires deep organizational knowledge and industry or functional expertise. It empowers them to ask the right questions and to derive the right insights.

Below are the techniques and analytics data scientists and analysts can implement and the business cases they are able to solve with the BE Engine.

MACHINE LEARNING CAN BE COMBINED WITH OTHER TYPES OF ANALYTICS TO SOLVE A LARGE VARIETY OF BUSINESS PROBLEMS



SOURCE: McKinsey Analytics: The Age of Analytics: Competing in A Data-Driven World

Combined with conventional optimization and statistical methods, machine learning can be useful in several settings. The use cases above are based on the size of the opportunity in the industries where there is the greatest potential to create value.



STEP 4: ENACTING CHANGE WITHIN AN ORGANIZATION

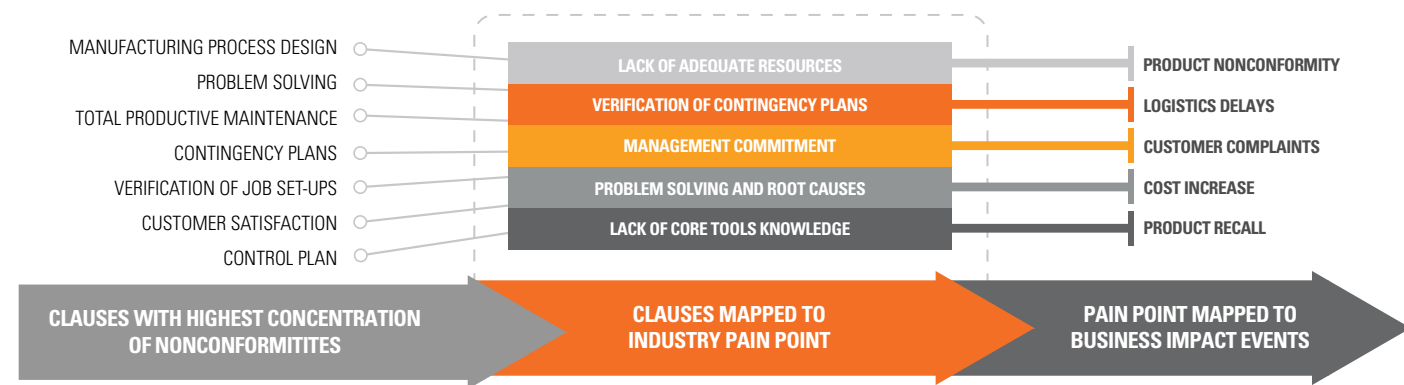
This step ensures that data insights are seen by the right personnel, as well as allowing for any changes to the data transformation process in order to fit a workflow effectively.

The BE Engine can be used to identify the main operational weaknesses for a client. These can be in relation to industry segment, standard, and/or geographical location, and can be achieved by identifying operational pain points and an organization's exposure to various risks.

During the first stage, the data is analyzed using the BE Engine. The data insights generated during this process are then considered by experienced global product managers to validate root causes and determine a client's risk exposure. This can be broadly translated into client or industry needs, otherwise known as pain points. The evaluation will incorporate expert opinion from a variety of disciplines to ensure the right solutions are matched to the pain points. In effect, what is created is a tailor-made Business Enhancement solution.

This process is incorporated into the workflow, known as pain point mapping. It follows a four-stage process:

AUTOMOTIVE CLIENT EXAMPLE



- **STAGE 1** – Identify and analyze the clauses with the highest number of nonconformities by industry/EAC code/NACE code/standard
- **STAGE 2** – Each clause is mapped to an industry or client specific pain point or root cause
- **STAGE 3** – Each pain point is then linked to an impact event, a negative situation that can impact normal operations
- **STAGE 4** – Each event will be mapped to its impact area and impact level (low, medium, and high)

This methodology highlights the specific business areas that are likely to impact the business, as well as what implications that business can expect. These include Brand Reputation, Legal Complications, Financial Impact, and Employee Morale.



STEP 5: CHANGING MINDSETS

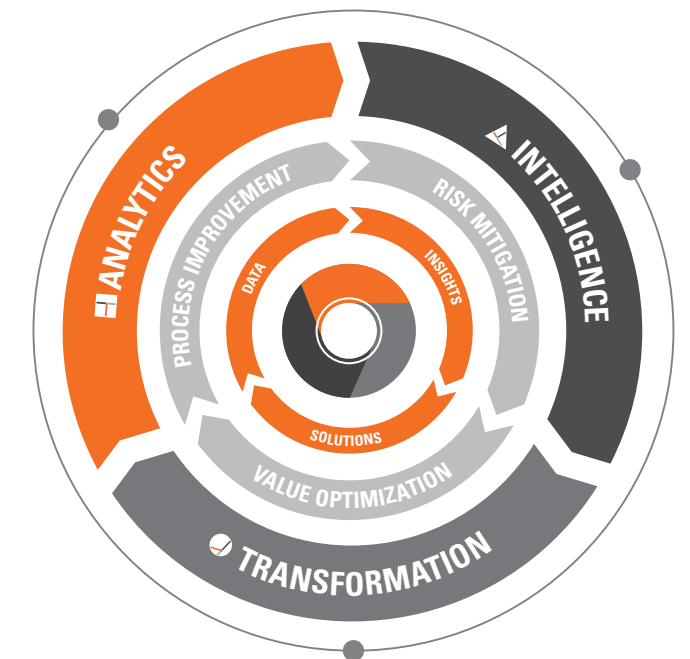
The change is not only technological. The culture within an organization must evolve to understand how data-driven insights can be used effectively within the decision-making process. To stay at the forefront of digital transformation trends, it is important to use these capabilities to tackle business problems with a whole new mindset.

In some cases, data-driven business models can be introduced to the industry. Digital natives have an enormous advantage, and to keep up with them, incumbents need to apply data and analytics to the fundamentals of the existing business while simultaneously shifting the basis of competition. At the same time, analytics can be applied to improve business core operations. This may involve identifying new opportunities on the revenue side, using analytics insights to streamline internal processes, and building mechanisms for experimentation to enable continuous learning and feedback.



The Business Enhancement (BE) Engine is a proprietary business intelligence tool aligned to SGS' data transformation methodology. Audit data and information stored in SGS' database can be analyzed using the BE Engine to identify main operational weaknesses for clients in relation to industry segments, standards, and geographical location. The system allows identification of operational pain points and assesses an organization's exposure to various risks. It can be used to identify compliance trends, determine risk exposure, and match effective solutions to individual pain points. Companies that partner with SGS will find they are setting new standards for business excellence.

The BE Engine was established as a Business Intelligence platform driven by three parts: Analytics, Intelligence and Transformation. Analytics begins with the analysis of our certification and audit data, which is segmented by the risk area of each industry. Intelligence provides a basic and in-depth assessment of the client's audit performance in comparison to various benchmarks. Transformation goes beyond simply identifying pain points. It identifies major impact areas and events that can be used to recommend training courses to help mitigate risks.



THE BE ENGINE KEY FEATURES:

ANALYTICS

- Analysis of Audit Data
- Audit Performance Assessment

INTELLIGENCE

- Performance Benchmarking
- Pain Point Mapping
- Risk Area Profiling

TRANSFORMATION

- Impact Event and Impact Area Analysis
- Impact Area Industry Benchmarking
- Business Impact Assessment
- Business Solution Recommendations



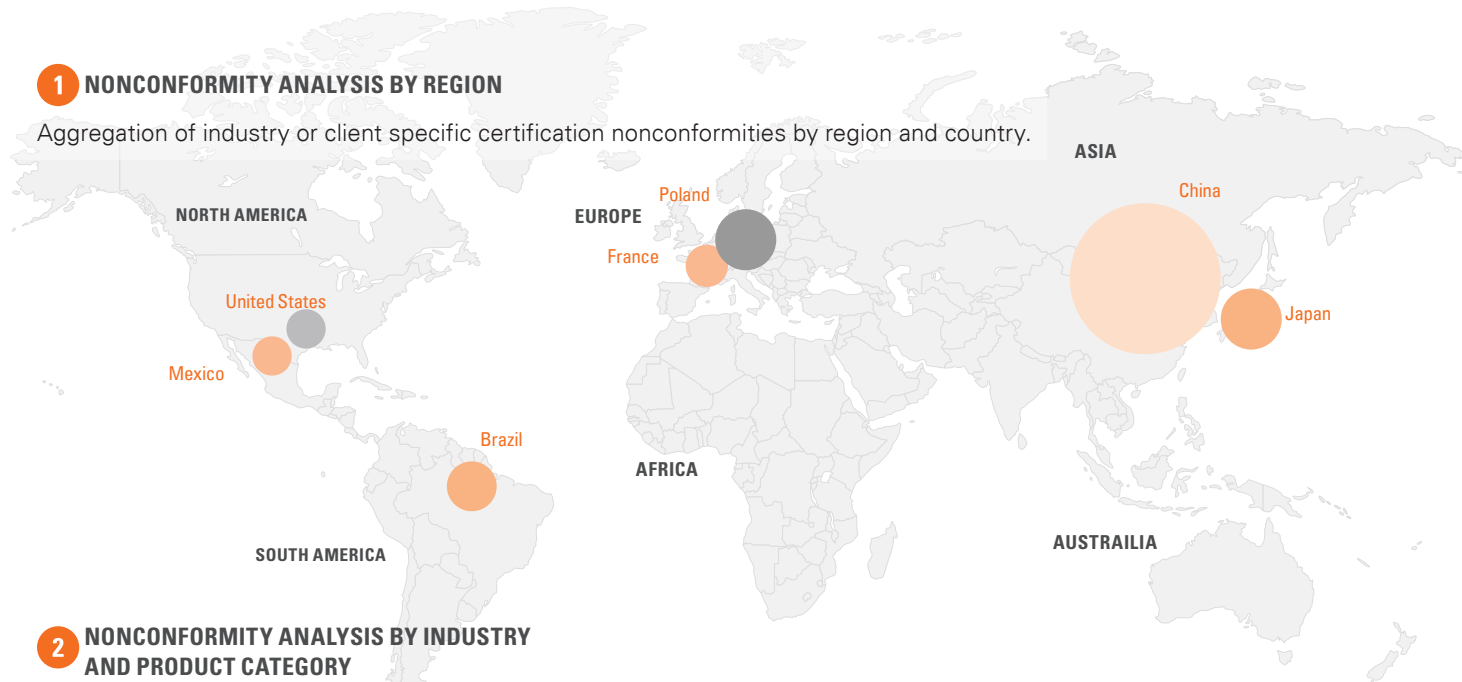
ANALYTICS

Analytics begins with analysis of our certification and audit data, which is segmented by each industry's risk area. Trends are then identified to pinpoint the key issues faced within that segment. Depending on the specific needs of the client, we can organize the data in a variety of ways to provide insights. The BE Engine can also provide aggregated data relating to industry- or client-specific certification nonconformities defined by time, region, facility, industry or product category, and standard clauses.

Analytics helps clients to perform aggregated analysis using all available audit records. Data can be manipulated in a variety of ways to help clients monitor and identify potential issues. This is extremely helpful in supporting the internal audit and risk assessment process.

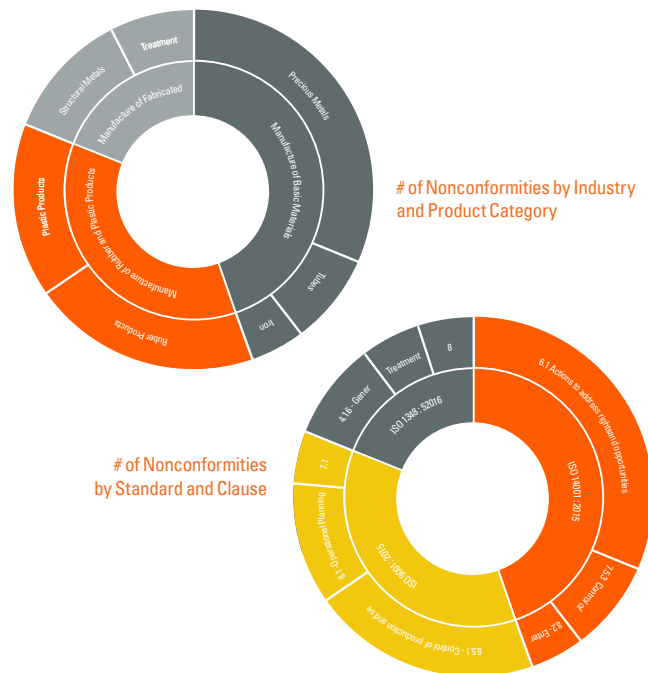
1 NONCONFORMITY ANALYSIS BY REGION

Aggregation of industry or client specific certification nonconformities by region and country.



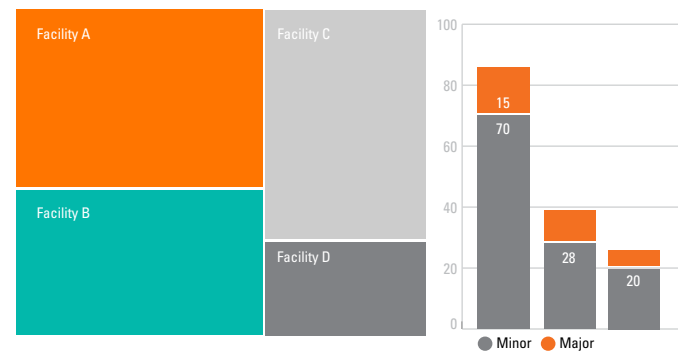
2 NONCONFORMITY ANALYSIS BY INDUSTRY AND PRODUCT CATEGORY

Aggregation of industry or client specific certification nonconformities by product category and standard clauses.



3 NONCONFORMITY ANALYSIS BY FACILITY, NONCONFORMITY TYPE AND STANDARD

Aggregation of client specific certification nonconformities by facility, standard and major to minor ratios.



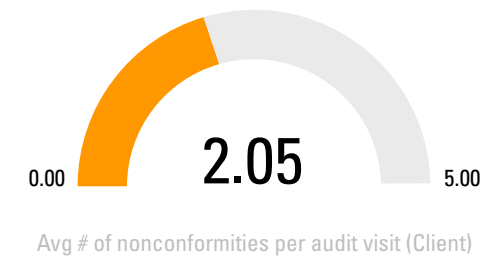
INTELLIGENCE

Intelligence provides a basic and in-depth assessment of the client's audit performance measured against a variety of benchmarks. These benchmarks are generated using metrics, including the average number of nonconformities per audit visit, average number of nonconformities per site/facility, and percentage of major nonconformities. Further evaluation of audit performance incorporates parameters such as region, standard, product category and technical analysis of how a client's nonconformity pattern/trend compares to industry norms.

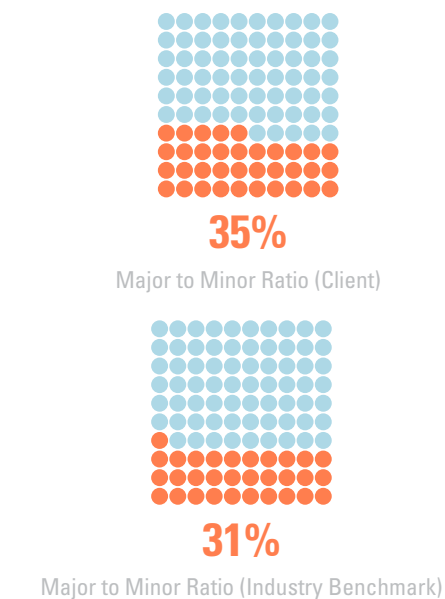
Intelligence also utilizes insights from audit data by incorporating technical knowledge and grouping nonconformities into a condensed list of pain points. Leveraging SGS's knowledge and experience, these pain points can be expanded to identify major root causes.

1 KEY PERFORMANCE METRICS

Benchmarking client's average number of nonconformities per audit against the industry.



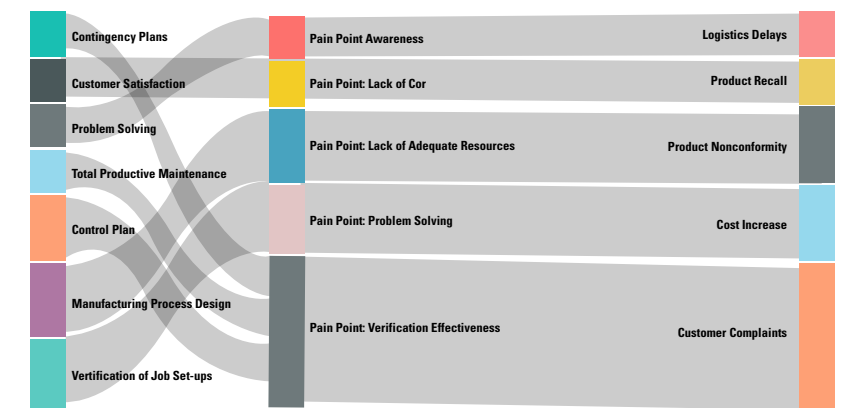
Benchmarking client's minor to major nonconformity ratio against the industry.



2 PAIN POINT MAPPING

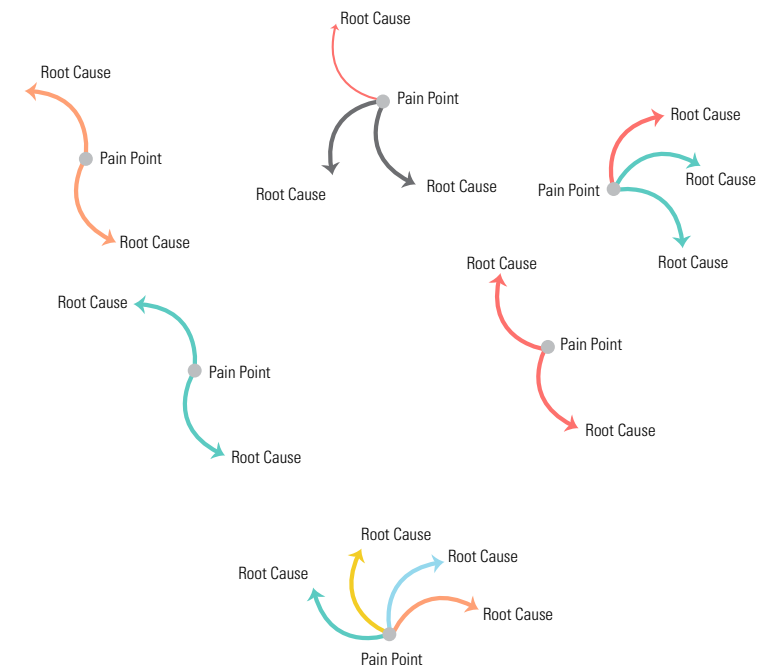
Matching top nonconformities with pain and impact events points identified by our product managers.

Client Pain Points and Impact Events Mapping



3 ROOT CAUSE ANALYSIS

Root Cause Analysis by keyword processing.



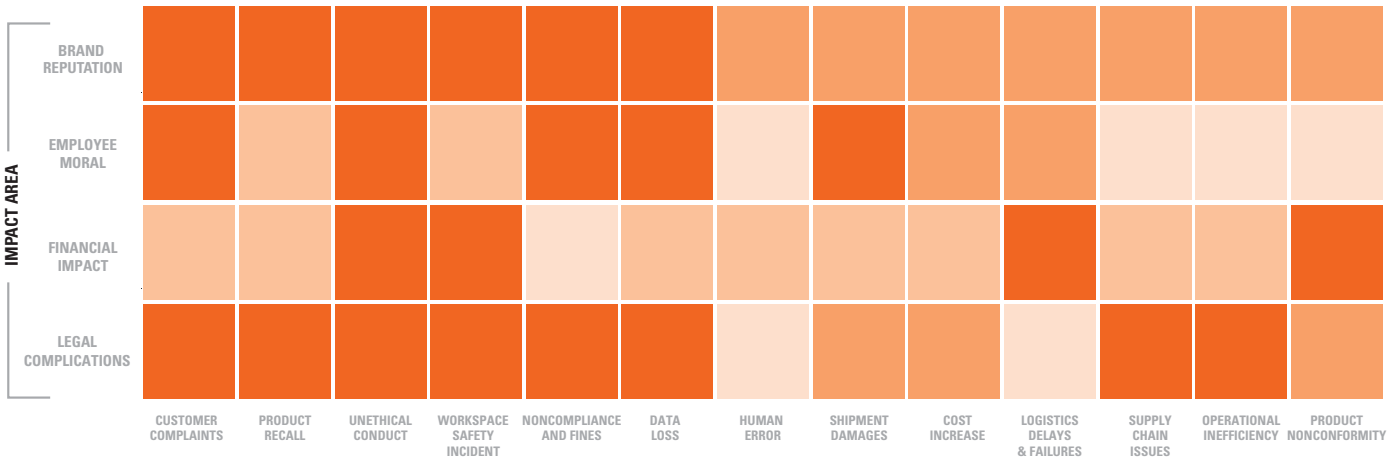


TRANSFORMATION

Transformation goes beyond simply identifying pain points. It identifies major impact areas and events. In addition, these proprietary insights can be used to recommend training courses to help mitigate risks and improve employee engagement, thereby enabling continuous improvement within the management system standards. This process is validated by a team of specialist technical managers and lead auditors.

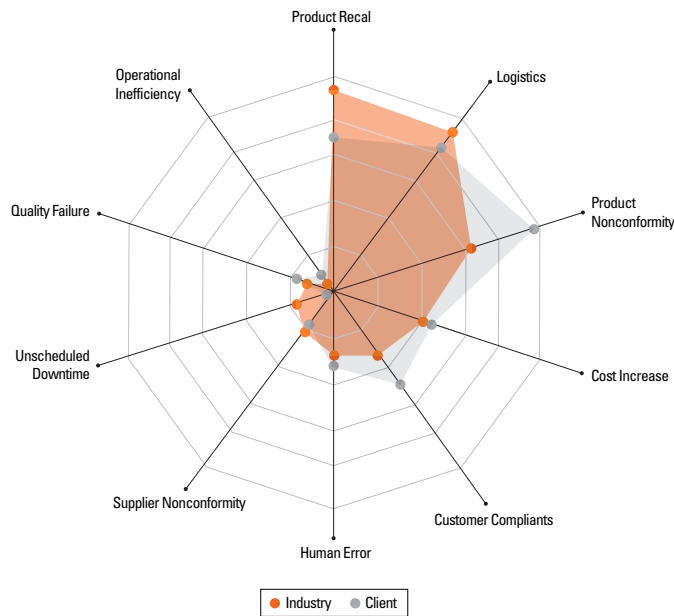
1 IMPACT AREA HEAT MAP

Mapping impact areas with a risk level of low, medium and high.



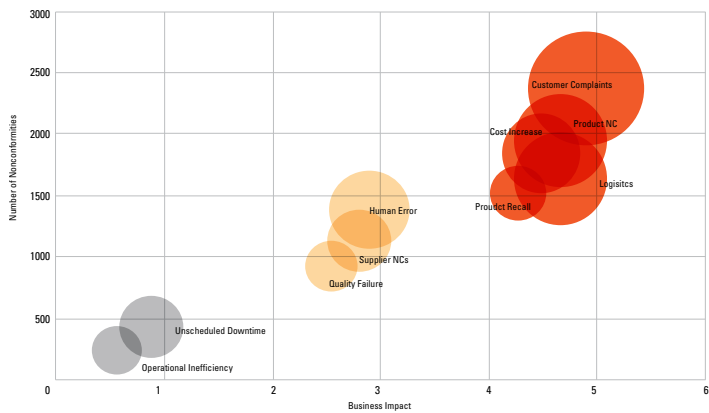
2 IMPACT EVENT GAP ANALYSIS

Benchmarking client's top impact events against the industry.



3 BUSINESS IMPACT ANALYSIS

Conduct business impact assessment and risk modeling by evaluating the business impact of the top impact events.



IMPACT EVENTS DEFINITIONS

IMPACT EVENT	DEFINITION
Customer Complaints	A consumer complaint or customer complaint is “an expression of dissatisfaction on a consumer’s behalf to a responsible party”
Product Recall	A request from a manufacturer to return a product after the discovery of safety issues or product defects that might endanger the consumer or put the maker/ seller at risk of legal action
Unethical Conduct	An action that falls outside of what is considered morally right or proper for a person, a profession, or an industry
Workspace Safety Incident	An injury or death which occurs in the workplace
Noncompliance and Fines	Failure to act in accordance with a set of standards or guidelines, resulting in monetary fines or legal implications
Data Loss	An error in information systems in which information is destroyed by failures or neglect in storage, transmission, or processing.
Human Error	Mistake caused by people versus machinery
Shipment Damages	Damage to products which have occurred during shipping
Cost Increase	An increase in operational costs
Logistics Delays & Failures	Issues in the efficiency and planning of the logistics of a product or raw materials delivery
Supply Chain Issues	Any negative incident that occurs within the supply chain and disrupts typical operations
Operational Inefficiency	Company’s performance measured against standard or prescribed indicators of effectiveness, efficiency, and environmental responsibility such as, cycle time, productivity, waste reduction, and regulatory compliance
Product Nonconformity	An error or disfunction in a product that was not part of the manufacturing design
Supplier Noncompliance	When suppliers do not conform or abide to a set of rules, standards or regulations being requested by buyers
Unscheduled Downtime	Unplanned disruptions in the production and delivery process



ABOUT SGS

SGS is the world's leading inspection, verification, testing, and certification company. SGS is recognized as the global benchmark for quality and integrity. With more than 94,000 employees, SGS operates a network of over 2,600 offices and laboratories around the world.

Enhancing processes, systems and skills is fundamental to your ongoing success and sustained growth. We enable you to continuously improve, transforming your services and value chain by increasing performance, managing risks, better meeting stakeholder requirements and managing sustainability.

With a global presence, we have a history of successfully executing large-scale, complex international projects. Our people speak the language, understand the culture of the local market, and operate globally in a consistent, reliable, and effective manner.







REFERENCES

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[Digital Transformation in The Tic Industry](#)

[The Age of Analytics: Competing in A Data-Driven World](#)

[4 Digitization Trends in the TIC industry](#)

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