ISG

Driving the Future: Transforming Homologation and Regulatory Compliance

How end-to-end ecosystems enable digital homologation and compliance

ISG Perspective

Illustrated by the example of NTT DATA – CERTassist™

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Globalisation – the driver for homologation services

The last three decades have indeed blurred geographical boundaries for most manufacturing companies. Whether setting up a manufacturing plant or selling locally manufactured products to international clients, manufacturers have experienced unprecedented growth and demand beyond their traditional geographies. As global market demand surges, managing and meeting the specifications from market to market emerged as one of the most complex challenges for OEMs – especially for automotive companies.

Homologation ensures that products with high safety requirements and vehicles meet the prescribed regulations and are fit for use in a particular country or region.

Homologation, by definition, is the validation and approval to certify that a product or vehicle is manufactured to meet the standards for sale in a country. It covers various product data attributes, including safety features, emissions, performance, and construction standards.

The increasing complexity of vehicle manufacturing drives the need for homologation digitised.

Automotive manufacturing has always been one of the most complex industries. The expanse of operations and the depth of its value chain make it challenging to govern. In addition, events causing disruptions in the global supply chain, increasing regulatory requirements, expansion of customer base, and the rise of electric and connected cars enabled for automated driving have added to the complexity of operating in the industry. Their new software-defined products allow rapid changes and functional enhancements through over-the-air updates throughout their life cycle. This requires the speed of approval and authorisation procedures to be aligned with the new realities. These factors have led to manufacturers being required to invest in strategic homologation programs. Various analysts expect that by the end of 2035, homologation spending will exceed $3B per year.

The currently broken world of homologation management.

Traditionally, most automotive manufacturers have relied on solutions supported by discrete in-point solutions to manage regulatory compliance. Organisations use home-grown or third-party solutions that address specific requirements and needs. This myopic solution design creates a fractured homologation data management practice. In many cases, homologation practice, at best, can be described as a fragmented ecosystem of multiple non-aligned systems – which may need manual intervention. This attribute outlines a range of challenges that need attention.

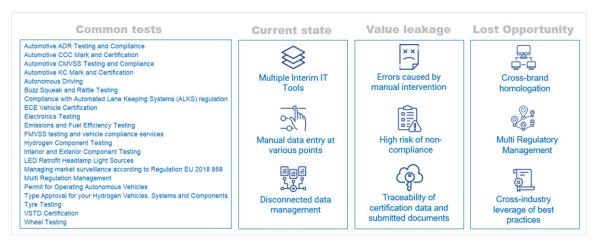| Common tests	Current state	Value leakage	Lost Opportunity
Automotive ADR Testing and Compliance Automotive CCC Mark and Certification Automotive CMVSS Testing and Compliance Automotive KC Mark and Certification Autonomous Driving Buzz Squeak and Rattle Testing Compliance with Automated Lane Keeping Systems (ALKS) regulation ECE Vehicle Certification Electronics Testing Emissions and Fuel Efficiency Testing FMVSS testing and vehicle compliance services Hydrogen Component Testing Interior and Exterior Component Testing LED Retrofit Headlamp Light Sources Managing market surveillance according to Regulation EU 2018 858 Multi Regulation Management Permit for Operating Autonomous Vehicles Type Approval for your Hydrogen Vehicles, Systems and Components Tyre Testing VSTD Certification Wheel Testing	Multiple Interim IT Tools Manual data entry at various points Disconnected data management	Errors caused by manual intervention High risk of non-compliance Traceability of certification data and submitted documents	Cross-brand homologation Multi Regulatory Management Cross-industry leverage of best practices

Figure 1: Current state of homologation compliance management

We anticipate a strong surge in streamlining the homologation data reporting requirement that can be delivered as a service soon. Such convergence of multiple data management and reporting tools can provide significant value to automotive companies.

Current homologation approaches have a variety of issues and value leakage

Non-aligned data management ecosystem: With globalised operations required to meet country-specific regulations, many automotive companies rely on non-aligned IT systems – such ecosystems of multiple systems are known to impact the quality and efficiency of a good homologation operation. Companies with such systems often must repeat tasks to comply with various regulations.

High discovery time and low traceability: Automotive companies have invested in building fragmented tools leveraged by different business units to comply with regulatory requirements. An array of discrete systems creates complex, unaligned, and less discoverable data. Organisations with such systems struggle with high information discovery and low traceability of information. In addition, low traceability increases compliance risk and reduces the market entry speed.

Lower cross-brand leverage: Using discrete and multiple systems disallows manufacturers to leverage the best practices used across various brands. Many companies are now looking at building a single source of critical information to leverage across multiple brands. However, the current state of the market is not mature enough to take advantage of cross-brand leverage.

Inability to integrate IT-based components: The main challenge is the homologation of new technologies to incorporate IT-based system components into the traditionally rigid automotive validation system. Contradictions in the type of approval in the early stages of development are a lack of knowledge about the technology on the authority and regulatory side. The lack of a centralised and aligned homologation process may result in value leakage.

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Time to respond to changing regulations: The lack of central market information and component data availability creates challenges in responding promptly to the evolving rules. The current systems often do not allow for real-time updates and modifications, which impedes incorporating changes into regulatory reporting.

Manual entries and intervention may affect efficiency and quality: Traditional systems rely on manual entries. Manual intervention not only lowers the efficiency of the process; it also may impact the accuracy of data reported.

The Rise of Platform-based Homologation Services

As digital transformation advances through product development, the imperative for platform-based homologation services, including regulatory compliance management, becomes increasingly evident. Start-ups and platforms are emerging to meet this growing demand through platforms and services. Established vendors like NTT DATA have been consistently investing in the evolution.

We outlined market drivers and a few best-in-class approaches to driving effective homologation operations. As an illustration, we leveraged NTT Data's CertAssist. NTT DATA offers CERTassist™ – a leading provider of comprehensive platform-based homologation services that seamlessly blends NTT's automotive expertise with leading technology in its cloud-native, AI-enabled CERTassist™ platform.

The complex IT landscape and expanding regulations will drive manufacturers towards a seamlessly integrated, platform-based homologation management. The role of such platforms will have an amplified effect in the software-driven car market. A mature and sophisticated homologation platform will empower manufacturers to bridge existing gaps across the intricate and highly digitised compliant product development process (cPDP). ISG expects that such best-in-class platforms need to showcase critical capabilities, for instance.

Cloud Native SaaS Solution: A mature platform will be a cloud-native homologation SaaS solution offering inherent advantages of a SaaS; a SaaS solution that delivers hassle-free maintenance, hosting, and continuous feature development, which reduces the operational burden on OEMs. Unlimited user access ensures widespread collaboration, while the subscription model guarantees cost-effectiveness. Embracing cloud-native architecture ensures scalability, flexibility, and constant innovation, empowering OEMs with a future-proof, efficient, and collaborative homologation management platform.

AI-Powered Processing: AI-based processing power will be a core element. Infusing artificial intelligence into homologation processing brings efficiency to unprecedented levels. By automating repetitive tasks, AI minimises manual efforts, accelerates decision-making, and enhances accuracy. This capability ensures proactive insights, identifying patterns and trends within homologation data. As a result, OEMs experience streamlined workflows, reduced time-to-market, and the ability to make informed strategic decisions based on advanced data analytics, contributing to an agile and competitive product development process.

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Highly Configurable Data Scheme: Best-in-class platforms will maintain a highly configurable data scheme. This enables OEMs to tailor the homologation platform to their product and process requirements. The flexibility of configurable data schemes ensures adaptability to changing standards, regulations, and internal procedures, fostering efficiency and accuracy in managing diverse product data sets.

Data Integrity and Integration: Best-in-class platforms ensure reliable and accurate homologation data by maintaining consistency across the entire product development lifecycle. Inbuilt integration capabilities streamline information flow and contribute to a cohesive and trustworthy dataset critical for compliance and decision-making. The platform's data integration capabilities align seamlessly with the complex, highly digitalised product development value chain, enhancing the homologation process.

Role-Based Rules: World-class homologation platforms enhance efficiency by assigning users specific roles and permissions based on their responsibilities in the homologation process. Role-specific alignment offers agility that ensures that each team member has access to relevant information, improving collaboration accountability and reducing the risk of errors or delays.

Collaboration and Work Orchestration: The capability of collaboration and work orchestration is pivotal in creating a synergised homologation eco-platform. This feature empowers teams to collaborate seamlessly, facilitating efficient communication and knowledge sharing. Effective work orchestration must ensure that tasks are well-coordinated, minimising delays and optimising resources. The advantage of a seamless collaboration means that OEMs experience heightened visibility into the homologation process through centralised communication channels and task management. This capability cultivates a collaborative culture where cross-functional teams work cohesively, fostering innovation and accelerating the product development lifecycle.

Platform Interoperability: We believe the homologation platform's interoperability will be a crucial asset within the intricate IT landscape of product development. Seamless integration with requirements management and PDL platforms fosters a cohesive workflow. This capability ensures that homologation data flows effortlessly between platforms, avoiding silos. The result is improved collaboration, reduced redundancies, and enhanced accuracy in decision-making. As an integral part of the broader product development eco-platform, interoperability optimises processes, allowing OEMs to navigate the complexity of interconnected platforms with efficiency and agility.

Multiple Regulatory Management: To be impactful, homologation platforms must-have features that facilitate compliance with diverse regulatory frameworks, allowing OEMs to navigate complex global markets seamlessly. The platform's ability to manage multiple regulations ensures that products meet various standards, expediting the homologation process, enabling reduced time to market, and lowering potential regulatory risks.

Data Transparency: Data transparency in a well-designed platform ensures unparalleled clarity in the homologation of relevant data. By providing transparent visibility, the platform instils confidence in the integrity of the information being processed across the value chain.

Status and Transaction historicisation: The platform should be able to offer detailed logs of status changes or transactions and provide a valuable audit trail. Such capability goes a long way in enabling organisations to trace back and understand the evolution of data over time. This feature enhances accountability and supports compliance efforts by offering a historical perspective on changes, fostering trust and ensuring a robust foundation for decision-making within the product development process.
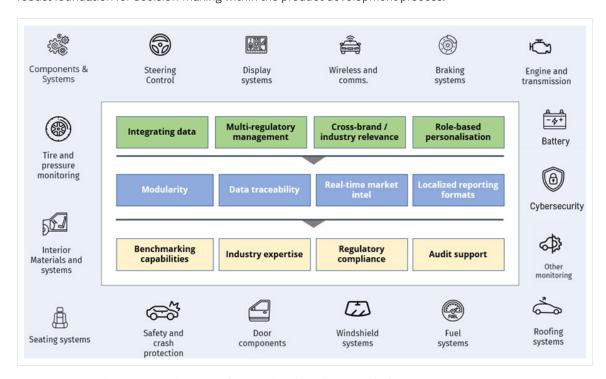

Figure 2: Data and expertise at the heart of an excellent homologation platform

Business advantages of leveraging a platform-based approach

Organisations can expect significant benefits from leveraging a world-class homologation platform. While there are multiple business advantages, a platform can support the following key business capabilities relevant to the compliant product development process:

- **Regulation management** – Easy and efficient generation of transparency for regulations. By delivering management on AI-based tools that leverage natural language processing powers, **organisations can reduce 30% to 40% of request handling time.**

- **Documentation and approvals** – Automatic generation of type approval documents establishes the foundation of a real-time e-governance process. This can **save up to 50% of effort on data ingestion and analysis.**

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- **Registration and related documentation –** Effective Mapping of type data and vehicle data through automatic ingestion from ERP systems for government processes can alone **reduce as high as 75% of input efforts and increase accuracy by 70% to 80%**.

- **E-Governance** – Establishing a digital information chain while authorities disburse a rule-based checking of information documents – as a digitally signed CoC (certificate of conformity) in real-time, in a closed loop.

Anatomy of a world-class homologation platform

A best-in-class homologation platform integrates all essential modules, functionalities, and corresponding data concepts into the compliant product development process. This facilitates end-to-end processing and efficient data integration and pays in as a comprehensive "one-stop-shop" with a "single-source-of-truth" approach.

A best-in-class homologation platform should not only provide transparency and traceability -- on both data and transactions throughout the relevant core processes it manages internally, but also offer seamless integration capabilities with other peripheral OEM platforms (PLM, ALM and others), technical services (TICs,), authorities. If needed, this may also include optional features for tailored cloud architecture and models.

Simultaneously, a best-in-class homologation platform should feature a modular architecture, providing flexibility and customisable configurations to meet each customer's unique business requirements, ensuring an optimal value-for-money match.

It should be flexible enough to serve all clients' target markets, accommodating multiple regulations mandated across various countries and regions. A significant value of a sophisticated and comprehensive platform is offering access to best practices and real-time updates on various industry regulations. Organisations can benefit significantly by sharing internal learnings and understanding of local markets for role-based users.

Some key benefits and characteristics of advanced and well-rounded platforms are, for instance:

1. They encompass all relevant domains to compliant product development process – Governance, Legal, Type Approval, Document Management, and Product registration.

2. They are modular – empowering the clients to define the exact scope as the business needs it.

3. They offer real-time insights and feedback on evolving regulations and reporting standards.

4. They personalise data and intelligence, offer industry best practices, and provide expert guidance on demand.

5. They offer easy integration into the existing IT landscape.

The graphic provides a high-level abstraction of a next-generation homologation platform's relevant modules, functionalities and data concepts.
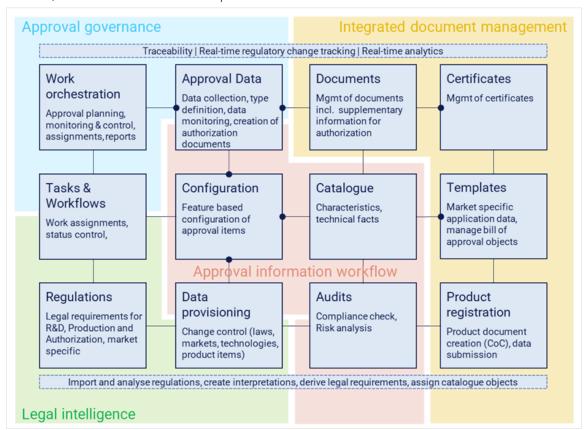

Figure 3: Anatomy of a homologation platform

Approval governance – Module that allows manufacturers to plan, execute, and monitor various projects in real time. This module forms the pillar of the operational homologation program – acting as the project management tool.

Legal intelligence – A legal module empowers and educates users with highly customised region or country-specific data requirements. This module integrates with the governance module to guide the proper workflows and reporting. Approval information is also assigned to authorities to validate the data before submission.

Approval information workflows – There should be provisions to enable information hubs to acquire, use, and release related data objects. Data Intelligence uses technical information describing the approval objects based on configuration rules for specific approval applications. This makes it possible to validate approval information before it is transmitted to testing organisations and authorities.

Integrated document management – Homologation documentation is a highly complex and ever-evolving activity. In many cases, documentation management often acts against streamlining efforts. A well-designed document management module helps organisations integrate their global documentation and reporting formats seamlessly.

Truly exceptional platforms go above and beyond, delivering value beyond their immediate scope. They support organisations in solving old operational paradoxes and innovating and transforming their business by granting access to unrevealed insights and expertise. While unleashing the power of digitalisation, the manage to provide real business.

Homologation IT Systems/Tools – market

The current homologation services market is custom-built for OEMs and discrete manufacturers. Often, OEMs maintain an internal homologation operation leveraging services available from specialists. This limits OEM's opportunities to scale benchmarking capabilities and establish gold standards in homologation reporting.

Clients expect homologation software vendors to understand embedded technologies, architectures, and security standards. Clients expect vendors to maintain a sturdy infrastructure of technology partnerships wrapped in a relevant professional services portfolio layer. When fulfilled, these expectations ensure long-term maintenance, system life cycle management, and continual innovation through the software.

The rise of GenAI and deep task mining has immense potential to change significantly how clients manage their homologation efforts. In addition, homologation vendors must have a solid understanding of embedded technologies and security areas. The growth of EV markets requires homologation software vendors to understand the implications of threats that emerge from digital realms and the recommended potential mitigation steps. Traditional vendors often face a challenge that limits the adoption of next-gen technology like AI into their existing systems. This offers modern platforms with industry expertise opportunities to drive more significant innovation in service delivery.

ISG believes that born-in digital homologation systems, such as **CERTasssist™ with NTT DATA,** are well-positioned to deliver substantial value to clients. Backed by a strong understanding of the manufacturing industry, NTT Data's CERTassist™ offers a great blend of technology and expertise in a platform.

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In conclusion

Automotive companies are expanding beyond traditional markets – competing with new-age competitors. As they enter specialised needs, the existing homologation approach may not be well-suited to deliver business value. With the rise of homologation as a service, data singularity and infusion of next-generation technologies are guaranteed. Modern homologation will be delivered over highly evolved platforms, combining artificial intelligence, industry expertise and technological acumen.

Automotive companies should review their current homologation to streamline their data management, allowing better response to the market.

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Amit leads ISG's Research Advisory business for EMEA. Amit works with global clients to design and execute strategy engagements for market expansion and to build sustainable competitive advantage. Amit leads a team of expert business consultants who work with clients daily to deliver business value through data-driven insights.

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NTT DATA "With over 50 years of experience and leading OEMs and suppliers as key clients, Automotive is an integral part of NTT DATA solution portfolio and services. CERTassist™ is an AI-enabled cloud platform designed for standardisation and collaboration that enables OEMs to master the digital transformation of homologation (system- and whole vehicle type approvals), vehicle registration Documents (IVI-CoC), and legal requirements management (among UNECE and others), accompanied by coherent industrialised Regulatory Compliance Management Framework of NTT Data and expertise of NTT Data qualified staff. NTT Data offers a lean PoC framework and a flexible modularised license model to best meet clients' business needs. NTT Data is your Trusted Global Innovator".

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