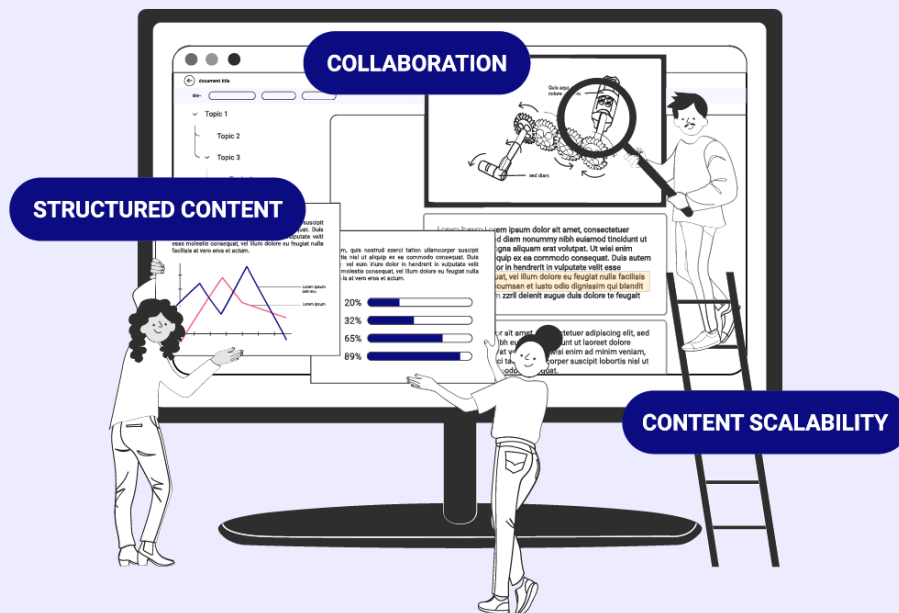




Solving Manufacturing Documentation Challenges

Enabling digital continuity to overcome documentation maintenance, delivery and compliance challenges



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Executive summary

Accurate, up-to-date information and documentation are critical for manufacturers of complex products to ensure product quality and to meet stringent regulatory standards. Digital continuity—the seamless flow of information from design to production, maintenance and end-of-life—provides a structured way to manage this information effectively. Industries such as automotive, aerospace and medical devices depend heavily on detailed technical documentation throughout their product lifecycles.

This white paper explores the primary challenges manufacturers encounter in delivering fit-for-purpose documentation. It introduces structured content and the Componize CCMS (Component Content Management System) as solutions to these challenges and outlines their numerous benefits.

By streamlining processes and ensuring accuracy, Componize CCMS has enabled manufacturers like Toyota, Airbus, and other worldwide leaders to enhance compliance, reduce costs and improve efficiency.

Introduction

Technical documentation is indispensable in modern manufacturing processes, particularly for industries producing complex, long-lifecycle products. As manufacturers face increasing product complexity, regulatory requirements and the need for faster time-to-market, maintaining accurate documentation becomes more challenging. Organizations risk inefficiency, non-compliance, and lost market opportunities without an integrated system to ensure smooth information flow.

Digital continuity is a concept that ensures product data and documentation remain accessible, consistent, and accurate throughout the product lifecycle—from design and production to servicing and end-of-life. By implementing digital continuity through Componize CCMS, manufacturers centralize their documentation processes and streamline content management.

Three essential concepts to understand before tackling manufacturing documentation challenges

Before diving into the specific challenges manufacturers face and the available solutions, it is crucial to understand three fundamental concepts: structured content, Component Content Management Systems (CCMS), and digital continuity.

Structured Content

Structured content is a method of organizing information based on a logical and standardized framework, separating content from its presentation. In this context, the **DITA (Darwin Information Typing Architecture)** standard is widely used. It is an XML-based framework designed to modularize and reuse content while ensuring consistency and interoperability.

Benefits for Manufacturers:

- **Increased reusability:** Content components can be shared across multiple documents or products, reducing duplication of effort.
- **Consistency:** Ensures uniformity of information across regions and teams.
- **Flexibility:** Enables multichannel publishing, allowing content to be easily distributed in web, PDF, or other formats.
- **Open Standard:** As an open standard, DITA ensures data longevity, avoids vendor lock-in, and provides manufacturers with the flexibility to adopt or change tools without risking their content's usability or accessibility over time.

Component Content Management Systems (CCMS)

A **CCMS (Component Content Management System)** is a specialized tool for managing structured content. Unlike traditional CMS (Content Management Systems) platforms, a CCMS manages each piece of content as an independent component, allowing for granular creation, management, and reuse.

Benefits for Manufacturers:

- **Enhanced efficiency:** Reduces time spent on redundant tasks through centralized and reusable components.
- **Optimized collaboration:** Enables multiple teams to work on different parts of a project simultaneously while avoiding version conflicts.
- **Automated publishing:** Automatically generates compliant documents, regardless of the distribution channel.
- **Compliance:** Simplifies the management of complex regulatory requirements through clear traceability and workflows.
- **Structured content integration:** When a manufacturer adopts structured content, a CCMS is essential to fully leverage the benefits of modularity and flexibility.

Digital Continuity

“Digital continuity is the ability to maintain the digital information of a [content] creator in such a way that the information will continue to be available, as needed, despite changes in digital technology. It focuses on ensuring that information is complete, available and therefore usable” —Wikipedia.

Digital continuity is a concept that ensures information remains accessible, readable, and usable throughout its lifecycle, regardless of technological or organizational changes. It involves preserving not only the data but also its context (metadata, relationships, and versions). Digital continuity is critical for manufacturers managing products with long lifecycles or subject to strict regulatory requirements.

Componize designs its solutions with digital continuity at the core. Documentation managers are encouraged to apply this principle to ensure their content remains accessible and usable over time.

Benefits for Manufacturers:

- **Elimination of silos:** Provides a coherent view of information across the organization.
- **Risk mitigation:** Prevents the loss of critical data during migrations or technological updates.
- **Process improvement:** Facilitates collaboration between departments and locations by ensuring information is always accurate and reliable.
- **Long-term support:** Protects essential data for regulatory compliance and future needs.

- **No vendor lock-in:** Ensures long-term accessibility and flexibility by using open standards and portable formats.

Challenge #1: content silos and labor-intensive tasks

Information galore: here, there and everywhere

The challenge

Manufacturers face significant issues due to content silos, where company departments, teams, and regions store and manage documentation and data in separate systems and formats. This dispersion of information forces teams in charge of technical documentation to rely heavily on manual work, including repetitive copy-pasting of data across systems, which contributes to outdated and inaccurate information, ultimately undermining decision-making and operational efficiency.

Solution and benefits

Organizations universally aspire to break down information silos. However, the reality is that silos persist due to a combination of cultural, technological, and structural barriers. Instead of wasting time and energy trying to break down silos, forward-thinking manufacturers are focusing on solutions that effectively leverage information where it already exists—and is likely to remain.

Componize CCMS represents a pragmatic approach to this challenge.

One of its unique strengths is its ability to **integrate smoothly and seamlessly** with manufacturers' pre-existing systems, allowing organizations to automatically pull information and data from disparate sources, and inject it into the documentation. This approach eliminates the error-prone practice of manual copy-and-paste, reducing the risk of inconsistencies and inaccuracies.

Moreover, Componize CCMS not only integrates with other systems, but it also offers **unique automation capabilities** by combining different extension frameworks. Whether you need to apply automated rules to content, transform images, transform content, or interact with external systems, Componize CCMS empowers you to build truly powerful automation workflows. As a result, you can streamline content processes and ensure that accurate, up-to-date information is always delivered.

Customer success stories

Toyota Motor Europe

Toyota Motor Europe (TME) implemented Componize CCMS to overhaul its service bulletin process—improving content accuracy and significantly reducing bulletin preparation time.

The Componize CCMS has been integrated with TME's centralized data hub and pre-existing third-party systems to ensure up-to-date information retrieval throughout the service bulletin process.

Thanks to this, TME has managed not only to automate the process of producing different types of service bulletins through custom workflows, but also to eliminate manual copy/paste tasks between systems, reducing both time and the risk of error.

For example, for each type of bulletin, a workflow is provided that oversees every stage of its life cycle, thus simplifying the authors' work. At the first step, a form is used to enter key information (such as trademarks, model names, model codes, engine specifications, transmission details, markets, etc.). This information, used to generate a pre-filled bulletin based on content templates, is pulled from a third-party system (Toyota's "datahub," which centralizes technical data from various sources). Data integrity is much improved, and users no longer need to manually reformat documents, eliminating manual copy-and-paste and their consequent errors.

Facing complex content challenges?

Let's talk

Challenge #2: managing diverse document formats:

Variety is the spice of life...

The challenge

Technical documentation in manufacturing can take various forms, including technical drawings, product manuals, maintenance procedures and files for software updates. The various types of content may require specific software tools and are stored in multiple formats, such as DITA, other XML formats, HTML, image files, video files, PDF files, CAD files, Microsoft Office™ documents, legacy content and more. This wide variety of document types and formats makes maintaining consistency across all documents challenging.

This wide variety of document types and formats makes it challenging to maintain consistency across all content. It often necessitates the use of multiple CMS to support these diverse formats, which significantly fragments the workflow of technical writers. Additionally, maintaining these various solutions is both complex and costly.

Solution and benefits

Effective management of diverse document types is essential in manufacturing. Componize CCMS enables manufacturers to efficiently store and organize a wide range of unstructured document formats—including Microsoft Office™ files, PDF documents, CAD files, HTML, images, and videos—alongside all structured formats such as DITA and other XML schemas or DTDs, all within a single system.

The solution goes beyond storage: users can edit XML documents as well as Microsoft Office files for example, directly within Componize CCMS. This includes the ability to browse, open, and save Word, PowerPoint, and Excel files seamlessly.

This streamlined approach simplifies document retrieval and updates, significantly reducing the time required to distribute critical information. According to a [2024 study by Componize](#), customers benefit greatly from the system's unique ability to manage both structured content and the diverse range of document formats handled daily by technical documentation teams.

Customer success stories

A global leader in industrial automation solutions

This company implemented Componize CCMS and streamlined its documentation processes, improved workflow efficiency and ensured consistent compliance across regions by integrating its diverse content formats, which include source code, HTML, PDF, Microsoft Office and Framemaker files.

The software development team provides code examples in various formats, including C# and Python, and integrates them into the Componize CCMS. The Componize CCMS then extracts and transforms the code into reusable DITA components, which the company's product team uses seamlessly to reference information in their technical documentation. This process promotes consistency and reduces the need for manual reformatting across different document formats.

In addition to managing structured content, this customer handles HTML packages, PDF files, Microsoft Word documents, Microsoft Excel spreadsheets and Adobe FrameMaker files directly within the Componize CCMS. Componize CCMS centralizes all components in a single system, which features unified rights management, workflows and processes. This approach provides significant advantages by enhancing consistency and control across all document formats.

Challenge #3: Long-lifecycle products:

Because some things are forever...

The challenge

Manufacturers in industries such as vehicles, airplanes, industrial machinery, pharmaceuticals and medical devices often have products with lifecycles that span decades and demand that their product documentation stays accurate and up-to-date over many years. Regular updates are necessary to reflect new features, safety standards and regulatory changes.

However, when creating documentation with currently popular software, such as Microsoft Word, Adobe InDesign, Adobe FrameMaker, and MadCap Flare, how can we be sure that the same software will be available in ten, twenty, or perhaps thirty years or longer? There is a significant possibility that today's software may not be available in the future, which could render the documentation unmaintainable.

Solution and benefits

Componize CCMS utilizes structured content in DITA XML, an open standard supported by the OASIS consortium. Unlike proprietary formats, DITA is tool-independent and uses a structured, modular approach based on XML, which is resilient to technological changes. This guarantees portability, reduces the risk of obsolescence, and allows easy conversion to future publishing formats. While initial adoption may require investment, it significantly lowers long-term costs associated with data migration and format incompatibility. Users can deliver up-to-date documentation in just minutes.

Componize CCMS also enables manufacturers to maintain product documentation throughout extremely long product lifecycles without losing track of changes or updates. The system's version control features ensure that every update is documented and traceable so teams can access the most recent version of a document and understand who made previous modifications and why.

Customer success stories

Global life sciences company

A global life sciences company frequently had long-term product maintenance requirements. For example, a hospital requested a new copy of a user manual for an air purifier purchased 12 years previously. This customer required a new documentation system capable of providing the manual and ensuring it includes updated contact details and company branding.

This customer implemented Componize CCMS, allowing seamless documentation updates, even for products delivered many years ago. As a result, updating information takes just a few minutes, even on a large number of documents, and even if they are very old. This is the power of modular structured content based on an open standard.

Facing complex content challenges?

Let's talk

Challenge #4: Ensuring compliance and regulatory adherence:

Rules rule!

The challenge

Compliance is a critical concern in manufacturing, especially in industries bound by stringent and evolving regulations. Every document, process, and update must adhere to specific regional and industry standards to avoid penalties, product recalls, or legal exposure. For manufacturers, ensuring compliance often involves tracking extensive documentation changes, maintaining detailed records, and providing auditable trails of approvals—all while managing tight deadlines and multiple regulatory frameworks across regions. Traditional manual processes are prone to error and inefficiency, making compliance a resource-intensive and risky endeavor. Ensuring long-term traceability for audits, sometimes spanning decades, is particularly challenging without robust systems in place.

Solution and Benefits

Componize CCMS offers manufacturers a transformative approach to managing compliance and regulatory adherence with minimal effort:

- **Traceability and auditability**
With detailed version histories and an audit trail for every action, Componize CCMS ensures traceability across the entire document lifecycle. This guarantees that manufacturers can provide clear, accurate documentation for regulatory inspections or audits, mitigating the risk of non-compliance.
- **Adherence to changing standards**
By seamlessly integrating with existing systems, Componize CCMS ensures that documentation adapts quickly to changing regulations across regions, without disrupting workflows. This adaptability prevents costly penalties or recalls and enables manufacturers to stay competitive in highly regulated markets.
- **Automated compliance reporting**
Componize CCMS can automate the generation of compliance reports, tracking document changes, approvals, and regulatory requirements in real-time. This eliminates the need for manual tracking, reduces errors, and ensures that compliance data is always accurate and up to date.
- **Specialized regulatory documentation**
For industries requiring compliance with specific regulations, such as FDA 21 CFR Part 11, Componize provides tailored documentation to support these needs. Our "Componize SaaS - FDA 21 CFR Part 11 Compliance Documentation" is available upon request, offering manufacturers a clear and comprehensive guide to demonstrate their compliance with these critical standards.

Customer success stories

Leading medical devices manufacturer

For this medical device manufacturer, the principle of “single source of truth” facilitated by Componize CCMS changed the game in terms of consistency, which had a direct impact on regulatory compliance.

As the content can easily be duplicated into different versions, for example to be delivered to separate countries, all the documents pass from hand to hand through different teams and processes. This can typically lead to delays in product delivery (at best) or CAPAs and audit risks (at worst), but most of these are avoided thanks to DITA and Componize CCMS capabilities.

The content team makes updates in a single place, and the updates are passed on where they have to. This enables them to maintain up-to-date legal content (ISO symbols and definitions, country-specific registration information, copyright and trademark information, notified body information, ...) across all documents with a perfect consistency. Add DITA profiling mechanism to publish the different versions, and you get teams that have far less mental load regarding regulations.

“All of this is becoming more and more useful as our teams work on an ever-growing number of projects, on very aggressive timelines. It is more and more difficult for them to track all of the details accurately, and in many instances now, Componize tracks this for them. As long as the CCMS team gets the initial updates and profiling into the system accurately, the system will apply the full range of updates wherever they are needed... even when the teams themselves are unaware of them.”

Challenge #5: Effective team collaboration: *We're all on the same page*

The challenge

In manufacturing document stakeholders, such as managers, technical authors, engineers, subject matter experts (SMEs), translators and end-users must all contribute to the final document to ensure it is accurate and effective.

However, disconnected workflows, communication silos and a lack of integrated tools often prevent these contributors from collaborating efficiently. The result is delayed documentation, inconsistencies and missed opportunities to improve quality and usability.

Solution and benefits

Componize CCMS provides a centralized platform that enables seamless collaboration among all stakeholders involved in the documentation process.

- **Inclusive collaboration**
From managers overseeing compliance to engineers providing technical details, all contributors can work in a unified environment. Real-time collaboration tools efficiently capture user inputs and reflect the latest data and designs
- **Integrated workflows**
The CCMS can integrate with engineering systems, project management tools, and other enterprise platforms to create a smooth workflow that keeps documentation aligned with product updates and organizational goals
- **Traceability and accountability**
With version control and audit trails, Componize CCMS ensures that every change is traceable to its source, fostering accountability and improving quality control
- **Extensive support for subject matter experts (SMEs)**
This enables them to collaborate more effectively and contribute their expertise to all technical documentation. Componize CCMS provides intuitive tools that allow SMEs to add their knowledge to documentation easily. By enabling real-time collaboration, SMEs can work alongside team members in different regions, improving the quality and accuracy of technical documentation
- **Integration with existing engineering systems**
Ensure documentation aligns with the latest product designs and updates. This integration helps documentation stakeholders streamline their workflows and improve documentation quality.

Customer success stories

One of the world's leading aircraft manufacturers

This aircraft manufacturer deployed Componize CCMS and the Componize Review platform for its maintenance program, providing a compliant validation platform to their customers (airlines) and regulation authorities.

One of the major challenges lay in the diversity of content formats involved in the validation process, including MS Word documents, PDFs, and various types of XML files, ranging from industry-standard aerospace formats to proprietary schemas.

Real-time communication with internal engineers on specific review comments now offers a viable and more efficient alternative to the in-person validation process that used to be the norm. With the maintenance report now structured as component-based content, the program chair can collaborate more easily with assistants to draft action items across a large number of reviewed documents.

Toyota Motor Europe

Toyota Motor Europe improved team collaboration when producing service bulletins by implementing Componize CCMS and integrating it with the intuitive Finto authoring tool. This solution allows multiple contributors, including engineers and technical authors, to work on modular DITA components in parallel, eliminating bottlenecks caused by sequential workflows. The system's guided workflows for the entire content lifecycle, from authoring to approval, enabled users to focus on their tasks and reduce errors. By streamlining its collaboration process, **Toyota Motor Europe cut the production time of service bulletins in half** while maintaining high quality and strict compliance standards.

Challenge #6: Localization: *Around the world in 80 languages*

The challenge

Large manufacturing organizations must effectively deliver multilingual documentation to meet the demands of international markets and comply with local regulations. Traditional manual localization methods can increase workloads, delays and inconsistencies when managing documentation across multiple regions. Ensuring linguistic accuracy, adapting content to meet regional legal requirements and maintaining technical precision add further complexity to this process.

Solution and benefits

Componize CCMS simplifies and streamlines the localization process through automated workflows, structured content, and intelligent translation management.

By reusing modular content components, manufacturers significantly reduce the volume of text to be translated, resulting in substantial cost savings. Componize manages translations from a single source language into as many target languages as needed, including chained translations where one target language feeds into others.

Its advanced Translation Management feature continuously monitors changes in both source and translated content, flagging only the segments that require retranslation. A color-coded dashboard provides a clear visual of translation cycles, making it easier to manage deadlines, optimize costs, and track progress.

The platform automates file preparation and packaging for translation, verifies translated files upon return, and intelligently assembles content, even when multiple translators or external vendors are involved. This automation minimizes human error and maximizes flexibility.

Finally, all localized content is centrally managed in the CCMS repository. Thanks to DITA-compliant assembly, complex multilingual documents can be published without the need for

additional tools or custom development, ensuring consistency, traceability, and speed at every step.

Customer success stories

Toyota Motor Europe

Toyota Motor Europe (TME) significantly improved its localization process by adopting Componize CCMS, which integrates with its centralized product data hub and employs standardized content workflows. Componize CCMS allowed TME to automate the multilingual service bulletin process prior to distributing them to its national marketing and sales companies (NMSCs) and **reduced translation lead times by 50%**.

The streamlined process ensured that service bulletins were linguistically accurate, compliant with local regulations, and ready for market-specific adaptation. By reducing manual effort and translation costs, **TME achieved an estimated €650,000 in annual savings** while enhancing the consistency and quality of its documentation across 53 countries.

Leading medical devices manufacturer

Translation is critical for medical device labels and manuals. With reusability induced by DITA, and Componize streamlining the publication and translation processes, the technical content and labeling team of this leading medical devices manufacturer **cut translation costs by nearly half** and **reduced translation delays by more than 60%**.

Challenge #7: Productivity & Automation:

Work Smarter, Not Harder

The challenge

Even after centralising content, many manufacturers still lose time (and morale) to repetitive, manual work: copy-pasting data between systems, re-formatting screenshots, converting legacy files, chasing reviewers, or re-building the same document structure again and again. As product lines grow and release cycles shorten, these low-value tasks become a bottleneck that erodes productivity, delays time-to-market and increases the risk of human error.

Solution and benefits

Componize CCMS brings true “lights-out” documentation by combining several automation frameworks into a single toolbox:

Automation lever	What it does	Example impact
Folder rules	Trigger automatic actions based on rules	Auto-resize & version screenshots on upload
Transformation/ Rendition Engine	Generate alternate formats on the fly (PDF, PNG, BW, thumbnails...)	Consistent visuals, zero manual editing
XProc pipelines	Chain complex XML transformations & system calls	One click to turn Word → DITA → publish
REST / CMIS / WebDAV / SFTP	Push & pull content or metadata from other systems (PLM, ERP, Git, archives, etc.)	Keeps docs in sync with engineering data
Workflow with automated tasks	Insert automated tasks into human workflows	Reassign overdue tasks, loop back for review, or escalate to a manager automatically based on delays

Key outcomes

- **50-80 % time saved** on routine prep (imports, conversions, image handling).
- **Error reduction** through rule-driven, repeatable processes.
- **Faster releases:** docs can follow the same sprint cadence as software.

- **Happier teams** who focus on high-value writing and review instead of busywork.

Customer success stories

Global industrial automation leader

This manufacturer uses Maven-driven imports to pull source-code examples straight from the developer repository; a rule instantly converts them into reusable DITA snippets, eliminating manual copy-paste and ensuring the docs always match the shipped firmware.

Medical-device manufacturer

Automated, multi-step workflows combine image validation, translation kick-off and final PDF generation. Translation delays dropped by **60 %** and audit packages are produced automatically for each release.

Conclusion:

The future is bright with digital continuity through Componize CCMS!

As products become more complex and regulatory requirements grow stricter, digital continuity will be essential for manufacturers seeking to maintain accurate documentation and efficient workflows. Componize's CCMS offers a proven solution to these challenges, enabling manufacturers to centralize, standardize and streamline documentation processes.

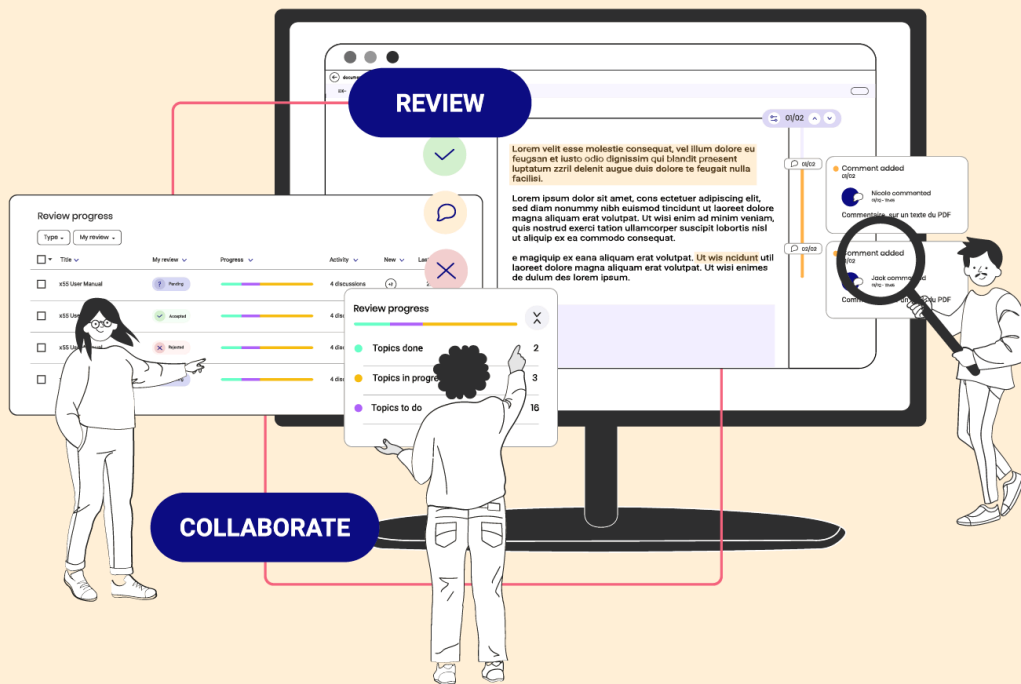
Manufacturers can transform their documentation processes by adopting Componize CCMS to enable digital continuity, improve operational efficiency and secure a competitive advantage. Companies like Toyota Motor Europe have achieved cost savings exceeding €650,000 annually, enhanced documentation accuracy, shortened lead times, reduced the time-to-market of some documentation deliverables by up to 50% and ensured compliance with global standards.

Facing complex content challenges?

Let's talk



THANK YOU !



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