

The CPG Digital Thread

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Streamlining Product Innovation and Commercialization

Bringing successful products to the consumer is challenging. It starts by targeting the right customer needs, which should permeate the innovation process and become the central theme throughout. It then requires an orchestrated effort drawing contributions from an array of people inside and outside of the enterprise. The program has to harness their input with precision and agility in order to compete in today's crowded global markets.

At the heart of the innovation process and the consumer experience is the product itself. The resulting product must deliver the value the consumer seeks in a pleasing and effective way. It must deliver on the customer promise with quality. Consistently offering products that anticipate and meet market needs creates consumer loyalty and brand affinity.

But there's a lot more to developing a winning product than a great formulation or product specification. A successful commercial product has to display the right marketing messages and brand perception. It has to be delivered in packaging that consumers enjoy. All of this together builds the overall experience that will keep consumers buying again and again.



The product must also be manufacturable, with ingredients that can be effectively sourced, and comply with a host of regulatory demands to avoid recalls and brand damage.

Each of these elements is critical to product success, each is interdependent on the others, and decisions need to be made rapidly to meet aggressive time to market goals. It's no wonder so many consumer products fail! Product innovation is hard, but there are substantial rewards for getting it right.

Introducing the Digital Thread

Developing a profitable product that excites consumers requires an integrated approach across the formula, packaging, and labeling aspects (among others). Unfortunately, most companies support the process with a patchwork of point solutions that are stitched together but not really integrated, resulting in poor efficiency, product launch delays, and missed customer expectations. Product developers have limited visibility to the impacts of their decisions on other product characteristics, leading to suboptimal decisions at an individual or departmental level.

Companies can no longer afford the inefficiencies and lost market opportunities that come from disjointed product data. The time has come to tie product innovation, development, and commercialization processes together with a holistic platform of solutions that provides continuity and connectivity of information, people, and processes. **It's time for CPG (Consumer Packaged Goods) companies to adopt the "digital thread" concept for product development to take innovation – and profits – to the next level.**

The Digital Thread ties product information, decisions, and history together in a structured, integrated way that captures product innovation, offers insights during product development, provides an integrated view of the product across the business, and captures product knowledge throughout the product lifecycle.

It connects product data from early in the front end of innovation through development, manufacturing, and commercialization to reduce cycle times, increase productivity, and create new value from fully captured and searchable IP.



“Connectivity between scientists and product developers should flow seamlessly, we want to connect the dots from science all the way to ERP.”

Frank Meyer | VP R&D | Unilever

Source: [Science Lifecycle Management in the Enterprise Ecosystem](#)

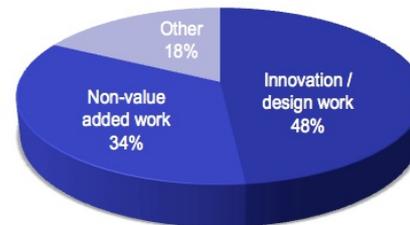
The Enterprise – Innovation Conundrum

The Digital Thread sounds compelling to some and intimidating to others, particularly those that spend their lives innovating and creating product value. Their job is to create value in one aspect of the product. For example a formulator or flavorist focuses on developing just the right recipe. A packaging specialist invests their time in creating the perfect design to entice the consumer. Anything that pulls them away from their work is non-value-added.

But companies recognize that the output of each innovator's work is part of a much bigger picture across the product lifecycle. Their work provides value to many others across the organization. For example formulation decisions impact packaging decisions, marketing claims, labeling, procurement, manufacturing, quality assurance, and more. Product information and decisions need to be captured and communicated to others, including other departments but also potentially suppliers, customers, and other partners. The IP created in R&D is a tremendously valuable asset that today is one of the most mismanaged assets in most CPG companies.

Time-to-market demands that companies free up innovators to create value as efficiently as possible.

Unfortunately, technical resources typically spend less than 50% of their time innovating. But enterprises need documented results from those that design and develop products, including scientists and other technical product developers. This creates a conundrum. CPG companies need detailed, accurate, and timely product data but can't afford to sacrifice individual contributors' time and effort by adding extra work to their highly educated, overburdened R&D resources.



Non-Value Added Time in CPG

Too often, documenting and communicating product information takes valuable time away from innovation resulting in longer development cycles and rework when timely data isn't available. CPG companies can't afford the inefficiency and errors of data discontinuity. It's time for a new approach.

Source: [Accelerate Innovation with Less Non-Value Added Work](#)

Help R&D Create Value

Before talking about how the digital thread helps streamline information sharing through the product lifecycle, let's talk about how it creates value in R&D.

Companies need to provide their innovators the right tools to efficiently and effectively do their jobs.

Today's leading design tools introduce modeling and simulation into design. These tools enable innovators to focus on developing the ideal solution for the consumer without having to worry about calculating supporting details. Automating the impact analysis of design decisions gives them the ability to iterate more freely.



“Without relieving the R&D formulator from the burden of manual or suboptimal processes, innovation will continue to be hampered, products will be released at a slow pace and companies will suffer from inferior product designs.”

Source: Computer Aided Design for Formula-Based Industries

As Computer Aided Design for Formula-Based Industries explains, **chemists, formulators, flavorists, and others need these advanced tools to automate calculations and other “grunt work” during formula development.**

Formulator(s) must be able to quickly iterate their designs in order to manage the trade-offs between cost, product performance and regulatory concerns. To support their work, chemists are often forced to build spreadsheets and other tools on their own to help them solve their problems.



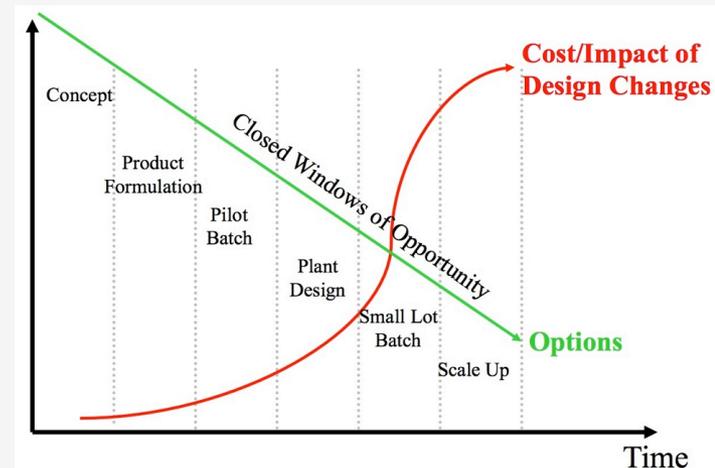
Innovation Impact of Compliance Check Timing and Automation

Help R&D Design in Context of the Whole Product

Design decisions can't be made in a vacuum; they must reflect impacts on the whole product from specs to commercial considerations. **Scientists developing new compositions have a lot to consider beyond product performance.** To develop a winning product offering, they must deliver what the consumer wants while considering impacts and trade-offs related to:

- Regulatory
- Sustainability
- Quality
- Cost
- Marketing claims
- Packaging
- Manufacturability
- Sourcing
- Supply chain and logistics
- Customer's perceived value
- Brand trust

Product developers have to consider all of this early in the process to get it right. If they fail to, it can lead to costly recalls and brand damage. These factors can't be checked after the fact, as it's currently done in too many companies. It simply takes too much time and creates expensive (and avoidable) rework.

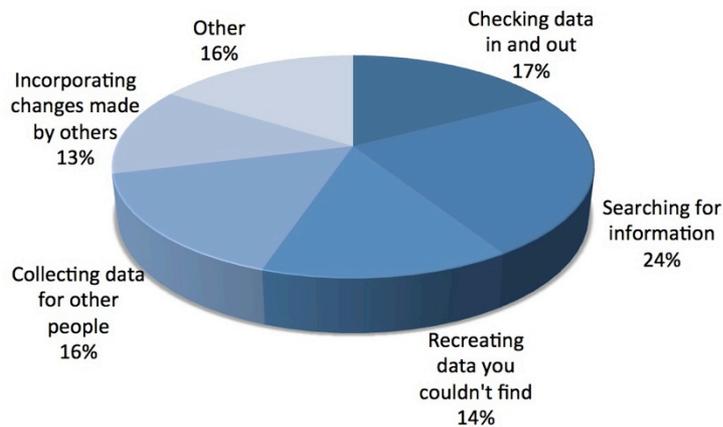


As the Closed Windows of Opportunity graphic reflects, **budget and schedule impact of change goes up drastically with time as decisions are “locked in.”**

R&D needs to consider impacts on the whole product as they make decisions at the bench level. But companies can't afford for their scientists to focus on every downstream impact when they need to focus on efficacy and performance. Their design tools need to do that by providing automated checks and alerts as a part of an integrated solution, so products get to market quickly and efficiently without leading to recalls and brand equity damage.

PLM Creates The Digital Thread for Enterprise Value

Streamlining the work of individual contributors, even in the context of the whole product, is not enough. The enterprise needs to make sure that information is carried from one step to the next, capturing and sharing information from inside and outside of the organization. Managing integrated threads of information focuses resources on requirements and ensures a holistic approach to a profitable product launch.



Breakdown of Non-Value Added Time - CPG

Source: [Accelerate Innovation with Less Non-Value Added Work](#)

PLM (Product Lifecycle Management) provides the backbone for the digital thread. It centralizes information and creates a corporate repository of IP that can be reused. It connects product innovation data and consumer needs from early in the innovation lifecycle all the way through commercialization. It also manages data relationships so the impact of changes can be easily understood and addressed.

PLM can even help with individual productivity. While companies need to be careful not to require extra work for PLM (see next section to understand how), a centralized backbone improves productivity because information is not recreated from step to step. It makes information easier for individuals to find and others to access.

The largest contributor to the unacceptably large percentage of time wasted on non-value-added tasks is searching for data. Another big distraction is collecting data for others and recreating data that can't be found. **The digital thread lightens the workload.**

Let the Integrated Innovation Platform Create The Digital Thread

Using PLM to provide the backbone for the digital thread does not, by itself, prevent extra burden on innovators. If the system requires additional work and duplicate entry it provides corporate value but slows innovation.

The way to solve the conundrum of letting individuals provide value while harnessing that value for corporate benefit is to use an integrated suite of design tools and PLM capabilities – the “Product Innovation Platform.” First and foremost, scientists and other technical resources need the right tools to do their jobs. Then, the value they create needs to be automatically harnessed for corporate benefit. The digital thread requires an integrated product innovation platform that addresses:

- Ideation
- Concept
- Specifications
- R&D
- Sourcing
- Regulatory
- Quality
- Packaging
- Marketing
- Manufacturing
- Commercialization / merchandising

This is clearly not possible with today’s typical patchwork of point solutions. Only an integrated suite of solutions within a product innovation framework can accomplish that.



“We need to manage our products and processes consistently across the whole lifecycle and enable this with systems...”

Paul McKenzie | VP Manufacturing & Technical Operations | Johnson & Johnson

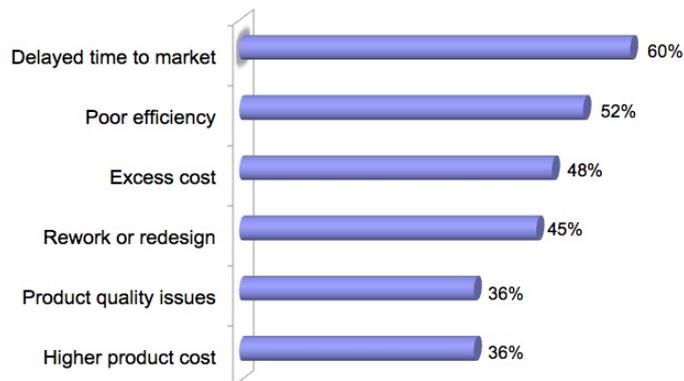
Source: [Science Lifecycle Management in the Enterprise Ecosystem](#)

As Tech-Clarity’s [PLM for CPG, Personal Care, and Cosmetics](#) suggests, “Ensure PLM initiatives work within the R&D environment by automatically capturing information as a part of the natural innovation process to avoid burdening the innovators.” Then, the digital thread – and the resulting searchable IP database – becomes a natural byproduct of work performed. Formulation decisions, lab notebook information, test results, even readings from machines can be integrated into the backbone. This approach simultaneously provides value to the designer as well as the rest of the enterprise.

Collaborate Along The Digital Thread

Developing along the digital thread provides unprecedented opportunities for collaboration. By centralizing and integrating information on all product aspects, people across disciplines (including partners) can contribute. Additionally, because data is already in place, designers don't need to take time out of their busy workdays to collect information for review.

Information in the digital thread, because it is a natural byproduct of design efforts, should be consistently up-to-date. Making decisions on outdated design data, on the other hand, has significant, negative business impacts.



Business Impacts of Outdated Product Data

Leading systems today are built for collaboration. They go beyond simple file sharing by providing social collaboration capabilities. These platforms are valuable to generate discussion from early concept through execution to ensure customer needs are in line with available technology by maintaining a dialogue between marketing, R&D, and others. Done right, **collaborative discussions become a part of the digital thread itself and provides valuable contextual information to complement other product IP.**



“56% report it takes more than 2 days to get updated data to the entire team.”

“71% say it takes a few days or more for 3rd parties to send design data after a making a change.”

“Top performers are 90% more likely to use real-time updates.”

Source: [Successful Products Start and End with your Customer Infographic](#)

Simplify and Accelerate Publishing Product Documentation

Centralized, up-to-date, and integrated data from the digital thread provides value in many areas. One area that's critical to time-to-market in Consumer Packaged Goods companies is product documentation. Documentation is the last mile to market introduction and one that often delays commercialization.

The digital thread captures and connects data from concepts, to requirements, to product specifications, to packaging, to tests, through manufacturing, and marketing. This means **that all of the information needed for dossiers, product information files (PIFs), product registration documents, and more should already be in one place.**

Consolidated, integrated data makes communicating that information much simpler because it's a matter of pulling it together in the right formats for different markets, validating it, and finalizing it for delivery as opposed to the typical data gathering "fire drill." Instead, the integrated, digital product information becomes the source for all downstream product communication requirements.



“Automate creation of product registration documents, including product Material Safety Data Sheets (MSDS), Product Information Files (PIFs), Qualitative Formula Reports, Quantitative Formula Reports, Country Specific Registration Documents and Formula Ingredients Statements/ Master List of Ingredients (MLI).”

Source: [Product Compliance – The Hidden Tax on Innovation](#)

Publishing product information from the digital thread speeds time to commercialization and the shelf because approvals can happen faster. It also helps address complaints and managing corrective actions easier because all information is in one place. It even helps companies implement any resulting product updates because changes update the digital thread. And best of all, it helps improve efficiency because **valuable scientist / designer time isn't spent on pulling data together.**

Innovate Along the Digital Thread

CPG companies have the opportunity to step up their product innovation processes and productivity to compete in crowded, competitive markets. In order to do that, they can leverage the digital thread to:

- Enable individual contributors with the right tools
- Integrate design tools within a product innovation platform that serves as the digital thread backbone
- Keep resulting information in context from early ideas through production and commercialization
- Make product information readily searchable to leverage product IP company wide
- Enable easier, more social collaboration
- Automate and streamline product documentation

Of course this can't be done with today's disconnected tools, data, and office productivity tools like documents, presentations, and spreadsheets. As [PLM for CPG, Personal Care, and Cosmetics](#) advises, "Understand that spreadsheets and shared folders are not enough to fuel the speed and throughput requirements to remain competitive in formula-based industries." [Science Lifecycle Management in the Enterprise Ecosystem](#) goes further, explaining that "Disjointed solutions and lack of integration leads to inefficiency, inability to reuse lab results, difficulty running analytics to find trends, and



"We are building competitive capabilities. We went from paper to ELN, opening up the opportunity to harvest key data and use it for modeling and analytics, and then link it with our design processes."

Frank Meyer | VP R&D | Unilever

Source: [Science Lifecycle Management in the Enterprise Ecosystem](#)

no mechanism to leverage scientific knowledge to become a 'learning organization' that leverages its scientific know-how."

Instead, **the digital thread removes the burden from innovators while creating a manageable IP asset** that provides value well into the future, resulting in better corporate IP, more time for innovators to innovate, fewer recalls, faster time-to-market, higher productivity, and happy consumers. The time for the digital thread to transform product innovation and delight consumers has arrived. Consumer Packaged Goods Companies that don't move toward a digital thread enabled by a product innovation platform will be at a disadvantage.



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About the Author

Jim Brown is the President of Tech-Clarity, an independent research and consulting firm that specializes in analyzing the business value of software technology and services. Jim has over 20 years of experience in software for the manufacturing industries. He has a broad background including roles in industry, management consulting, the software industry, and research.

Jim's experience spans enterprise applications including PLM, ERP, quality management, service lifecycle management, manufacturing, supply chain management, and more. Jim is passionate about improving product innovation, product development, and engineering performance through the use of software technology.

Jim is an experienced researcher, author, and public speaker and enjoys the opportunity to speak at conferences or anywhere he can engage with people with a passion to improve business performance through software technology.