



How to Grow a Software Business Within a Legacy Company: You Don't

Lionel Bouchard^{ID} and Michiel van Genuchten^{ID}

From the Editor

This column departs from our usual Impact model by asking and then answering based on the authors' extensive experience, a specific but often under-addressed question.—*Les Hatton.*

MANY MARKET LEADERS stumble when an industry goes through the digital or software revolution. Famous examples are IBM, Xerox, and Nokia, all of whom had the market share and technical knowledge to dominate the emerging software businesses in their industries. With hindsight, it can be said that they missed the opportunity and were beaten by, at the time, small start-ups like Microsoft, Adobe, and Android. It looks like the car industry and medtech will show similar results where the incumbents are stumbling in the digital era trying to create big platforms to defend their legacy business.

Recent examples are Predix from General Electric¹ and Cariad² from Volkswagen.

We have lived through the digital revolution ourselves as executives in different companies and industries in multiple countries across North America and Europe. This column reflects our successes and failures over the last 25 years in start-ups and in legacy companies. Our employers allowed us to report some of our adventures in *IEEE Software* and other journals over the past decades.^{3,4,5} We believe the story is relevant in times when “every company is a software company.”⁶ The column is intended for engineers and managers facing the increase of software in their products and services.

Why Do Legacy Companies Often Fail in Software?

The question “why historically strong companies fail to keep pace with digital-native challengers?” is stated in a Harvard Business Review paper from 2016.⁷ One of the main explanations presented is that “the failure stems partly from how hard it is to walk away from a successful business model.”

The story starts with the fact that the reproduction cost of software is (close to) zero, and therefore it is key to becoming the volume leader. The volume leader can generate the most revenue and margin, allowing more investment in development, marketing, sales, and infrastructure. That is a major difference between software and many legacy industries. In

a legacy company, a global market share of 10% often puts you among the leaders. For example, Toyota is the market leader in the car industry, with a 10.7% global market share.⁸ Heineken is number two in the beer market, with 13% market

means that software is not a priority among upper management. As a result, the software teams are a logical victim when the core business faces headwinds. Upper management has grown up in the legacy business and in times of trouble, their typical

their competitors or to another industry, which is likely not prioritized by the senior management.

Another risk is a halfhearted approach toward separating the software business from the legacy business. Take Nokia as an example: 49% market share in mobile phones in 2007. Nokia made its operating system Symbian available to other mobile phone vendors, such as Samsung and LG, for around US\$10 per phone. However, the version of Symbian available to competitors was always behind the proprietary version Nokia deployed in its own flagship products, limiting adoption.

Nokia failed to monetize its software ecosystem. While Apple and Google quickly realized that an app store was the key to software-driven revenue, Nokia's Ovi Store launched late and failed to gain traction. By the time Symbian was struggling to attract developers, iOS and Android had already built multibillion-dollar software ecosystems.

Symbian was supposed to be independent from Nokia, but during our visits to the London headquarters, we noticed many people spoke Finnish, reinforcing the perception that Nokia never truly let Symbian operate as a standalone software business. With hindsight, it is not surprising that many phone manufacturers shifted to Android when it became available to them for free, from a company that was, at the time, not a competitor.

"Let's acquire a software company" is often seen as a solution. We have been acquired multiple times, and it is usually a good outcome for the shareholders of the software company. It goes wrong for both the legacy and the software company when the latter is reduced to the engineering team because "the legacy sales

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share, behind number one Anheuser Busch InBev, with 26%.⁹ Compare that to the 80% to 90% market share of some leading software companies in their core businesses that may be search or office systems.

The question is how to get from a 10% market share in a legacy product to a market share of 50% or more in the emerging software market in your business. First, we discuss what typically goes wrong in legacy companies and, after that, how it can be done. It may be less relevant for the rare companies whose legacy products hold more than 50% market share, as their software already dominates in volume simply by bundling it with their established hardware offerings. However, franchises like Apple iPhone in the United States and certain medical devices in the global market are exceptions. If you are such an exception, congratulations.

Within legacy companies, software is often not invoiceable. Therefore, there are only costs associated with software and no revenue. This

response is to "go back to the core." They may not realize that the added value shifts from hardware only to include software. The core is shrinking because some competitors can monetize the software, and the hardware is commoditized as a result. The management gets into a vicious circle of reducing the bill of material of their hardware and rightsizing the business, not realizing that the market and the competition have changed.

Typically, the market leaders in a legacy business are companies with many employees and large engineering teams. Large engineering teams of technical people tend to focus on big things like platforms. This is unfortunate since their core knowledge is more likely in applications. "A shipping company knows about ships" and "a TV company knows about video" (more about that later). Legacy companies often only use their platform in their own product, so their volume will not exceed the number of legacy products they sell. Selling more would mean selling to

channel and the legacy processes will take care of the rest.” Successful software teams are close to the customer via sales, product management, bug fixing, and real-time data on software usage. Software companies operate differently from hardware firms. Stripping them of their commercial autonomy is a recipe for failure. A famous case is HP’s acquisition of Autonomy, a software company that specialized in enterprise search and artificial intelligence, for US\$11 billion.¹⁰ Within a year, HP replaced Autonomy’s sales force, failing to recognize that software sales require a different approach than hardware. This contributed to a write-off of over US\$8 billion.

An Example: Competition and Startups in Video Streaming Over Two Decades

One of us (Lionel) worked in video streaming technology from 1995 to 2016. As a research engineer at Philips, he contributed to the Moving Picture Experts Group (MPEG)-4 standard, which later played a key role in the streaming revolution. By 1998, recognizing the potential of this technology, his team proposed launching a streaming-focused spin-off. However, leadership blocked the initiative, arguing that the company should transition from broadcast TV to streaming using internal resources rather than allowing a startup to take the lead.

Instead of operating like a startup, the team was transferred to a business focused on developing and selling MPEG-2-based digital TV equipment. Substantial engineering resources were made available. With hindsight, the financial investment, the go-to-market strategy, and the entrepreneurial flexibility necessary to drive a new business forward were lacking. Philips remained stuck in a perpetual

proof of concept mode, never managing to translate technological leadership into a viable business.

Lionel later joined RealNetworks, which operated as a startup while developing and deploying the first large-scale streaming solutions—first for audio, then for video.⁴ Their go-to-market approach was hybrid, leveraging both business-to-business and direct-to-consumer strategies: RealNetworks licensed its technology to telecom operators, Internet service providers, and major media companies, enabling them to stream content to their own customers. RealNetworks also built its own ecosystem of RealPlayer users, allowing individuals to stream and consume digital media. A third way to increase the volume used a Freemium model to drive adoption with the launch of RealPlayer as free software, allowing users to access streaming content and monetizing premium features through subscriptions and enterprise licensing.

Legacy companies like Philips kept their technology tightly integrated with its MPEG-2 broadcast ecosystem but RealNetworks was platform agnostic and made its software available on Windows, Mac, and Linux, maximizing reach and adoption.

RealNetworks was able to scale its adoption quickly and position itself as a key player in the early days of streaming.

By 2010, RealNetworks was struggling to compete against major tech players like Google. The three main changes in the market observed were the shift in market demand from operators to pure consumer streaming. The rise of over-the-top media service (a digital distribution service offered directly to viewers via the public Internet services) reduced the dependency on operator-based distribution. The second main change was

the rising importance of content that became the key to consumer adoption. The third main change was the rise of smartphones as a platform for video consumption. RealNetworks remained PC-centric for too long. Despite having one of the first large-scale streaming platforms, RealNetworks had failed to adapt its go-to-market strategy as the market evolved and became a legacy company.

Meanwhile, Netflix, originally a DVD rental service, was quietly building its own streaming platform. Unlike RealNetworks, Netflix focused on direct consumer relationships, establishing a subscription business with predictable revenue. It secured early streaming rights, positioning content as its core value proposition. The shift from mailing DVDs to streaming was a natural progression, as Netflix’s true strengths were content distribution and user experience rather than physical goods (like Philips and Sony) or technology (like RealNetworks). Without the burden of legacy business constraints, Netflix moved faster and ultimately dominated the digital streaming industry.

What Did Successful Legacy Companies Do Differently?

The good news is that legacy companies can become successful in the software business. One of the best documented examples is Dassault Systems that grew out of an aerospace company and became the world market leader in CAD/CAM software.¹¹ At the end of the 1960s, some engineers in Dassault Aerospace started using computers to smooth the curves on planes and wings like mechanical engineers could do on paper. By 1977, all Dassault planes were designed and manufactured with the help of computers.



ABOUT THE AUTHORS



LIONEL BOUCHARD is the CEO of TYNDALL FX, 75020 Paris, France, a French deeptech startup pioneering real-time 3D mapping and on-device AI for advanced terrain analysis. Contact him at lionel.bouchard@tyndallfx.com.



MICHEL VAN GENUCHTEN is an academic director of an executive master's study at TIAS School for Business and Society at Tilburg University, Tilburg, 5037 AB, The Netherlands. He also supports start-ups and legacy companies growing their software business. Contact him at genuchten@ieee.org

In that year, it was decided to rewrite the software and create a next generation product called computer-aided 3D interactive application (CATIA).

In the 1980s, the company faced a decision: "Should the company keep the product only internally, taking advantage of its benefits to maintain an edge over the competition, or should it create a new business to sell the software outside of the company? The first option turned out to be a dead end. There were only 15 CATIA developers on the team. How could Dassault afford to fund the hundreds of developers who would be needed in the future to address all of the necessary functionalities, even for one company? Eventually, another company would replace CATIA with a new product that Dassault Aviation would have to buy."¹¹

And the rest is history: Dassault Systems became independent and the world market leader in CAD/CAM. They were able to sell their software to Boeing and other aerospace companies, but they also ventured into other industries, such as the car industry. Both the aerospace

and the software company are still public companies. The value of Dassault systems is now more than double that of Dassault Aerospace (on March 21, 2025). A second paper describes the Boeing side of the same story: "Developing and Using CAD/CAM/CAE Systems in Boeing."¹² It is the other side of the coin.

Lessons Learned

First of all, there is no simple recipe for success since companies and industries are in different positions and phases. The Dassault example shows that there is an approach for companies to be successful in the software business without sacrificing the legacy business. And there are more examples in different industries, some of whom have agreed to write a column for 'Impact' so we will not give away their story. Lessons learned for legacy companies include:

1. Make software invoiceable and get a profit and loss responsibility for the software team as a result. Let them take care of their own business.

2. Create some form of separation between the legacy business and the software business. A separate go-to-market and the right to sell software to competitors of the legacy business is a necessary condition for success.
3. Focus on go-to-market and applications more than on technology and platforms. Build on your core software competences that are more likely close to the customers in applications.

It is clear to many that by now "software is eating the world" and "every company is a software company." Many legacy companies face similar choices to those Dassault faced in the 1980s. What the future may bring is hopefully many successful software companies that grow out of legacy companies, serving the interest of their customers, employees, and shareholders. 

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