MIS Quarterly Executive

Volume 23 | Issue 1 Article 2

March 2024

Transforming to Digital Product Management

R. Ryan Nelson

MIS Quarterly Executive

Transforming to Digital Product Management

Drawing from extensive field research and descriptions of how CarMax and The Washington Post transformed, this article advocates shifting from managing IT projects to digital product management, thus enabling nimbler, digital-first enterprises that can adapt in the face of increasing environmental uncertainty. Such transformations are facilitated by adopting Agile and DevOps practices to create a radically different engagement model based on stable, cross-functional teams that are empowered to prioritize continuous innovation and business outcomes over traditional project objectives.[1,2]

R. Ryan Nelson
University of Virginia (U.S.)

The Need for Digital Product Management

Three fundamental shifts are intensifying pressure to digitally transform[3] the enterprise. First, the accelerated adoption of digital products is driven by efforts to embed technology throughout the customer experience, from personalization to seamless omnichannel delivery. Organizations are increasingly using digital products (i.e., IT applications) to automate and integrate business processes more than ever before. Second, the growth of IoT- and AI-assisted processes, mobile and cloud computing, platform as a service, low- and no-code tools[4] and data lakes are putting unprecedented technological capabilities into the hands of billions of workers. Third, companies are failing faster[5] as a result of both environmental change and nimble competitors operating with novel, technology-enabled business models. The ultimate goal of digital transformation is to create a digital-first enterprise that continuously improves and innovates to delight customers and reduce costs faster than the competition.

1 Blake Ives is the accepting senior editor for this article.

2 The author expresses his gratitude to members of the review team, in particular, Blake Ives, for their guidance and support throughout the publication process. Their expertise and insightful suggestions contributed significantly to the final outcome. The author is also immensely grateful for CarMax's and *The Washington Post's* cooperation during this research project and their openness in sharing their experiences.

3 Digital transformation can be defined as rewiring an organization, with the goal of creating value by continuously deploying technology at scale.

4 See Carroll, N. and Maher, M. "How Shell Fueled Digital Transformation by Establishing DIY Software Development," *MIS Quarterly Executive*, (22:2), June 2023, pp. 99-127.

5 Corporate mortality rates are increasing, as reported in Dohnalek, M. *Corporate Death Rates Are Rising*, Forbes Technology Council Post, September 16, 2022. In 1958, the average lifespan of S&P 500 companies was 61 years. Currently, it is well under 20. And by 2027, 75% of S&P companies will no longer exist.

DOI: 10.17705/2msqe.00087

IT Project Management vs. Digital Product Management

An **IT project** is a temporary endeavor with predefined time and budget constraints undertaken to create a unique product or service. *Project management* is the systematic application of skills, tools and techniques to plan and execute projects using temporary teams, and has been practiced for thousands of years dating back to the Egyptian epoch. Yet, as reported by The Standish Group,[7] only 35% of the IT projects undertaken worldwide are successful. Some estimate that the cost of IT project failure at $10 trillion per year.[8]

A **digital product** is a named collection of business capabilities valuable to a defined customer/user segment. A digital product may comprise any combination of people, processes, data and technology required to deliver the entire product experience. Products do not need to be purely digital. Many of the best examples today are blends of online and offline experiences—like finding a ride or a room for the night, getting a home loan, completing a sales transaction or sending an overnight package. (Additional examples of digital products are provided within the case studies reported in this article.) *Product management* is the discipline of building, implementing and managing digital products, and is practiced by Silicon Valley digital-first companies (e.g., Amazon, Apple, Facebook and Google). Digital product management covers the complete product life cycle and requires empowered, durable product teams engaging with all relevant stakeholder groups. For information on digital product management, see the Center for the Management of IT's *Product Management Resources*, available at https://www.commerce.virginia.edu/centers/cmit/product-management-resources.

Unfortunately, applying old approaches to building and implementing digital solutions—including centralized decision-making, once-a-year planning and budget cycles, and a project-driven mindset—is at the core of IT and digital transformation failures. Joe Peppard and R. M. Bastien argue that "The root cause of the problem that most organizations have with getting value from digital technologies is the way they are currently organized to embrace and engage with them. They are designed to *manage IT* rather than *deliver value from IT*. Though the difference might seem subtle, its implications are profound. … leading to an engagement model that needs a radical overhaul."[6] Furthermore, they state that an organization's focus should shift from carrying out digital projects to delivering digital products if it is to successfully compete in a digital world marked by increasing uncertainty. In other words, organizations should shift from managing IT projects to managing digital products (see text box above).

Shifting an organization's digital focus from a project to a product orientation creates a radically different engagement model that requires foundational change, and requires different skillsets, practices and organizational structures, including enterprise-wide decentralization of IT talent, control and decision-making. With a product-oriented focus, work is organized into empowered, cross-functional, stable teams that collaborate closely with customers to discover, learn and make incremental improvements throughout the product lifecycle. Table 1 contrasts digital project- and product-oriented management across a variety of perspectives. These perspectives can help managers select the best approach for a given initiative (discussed in more depth below).

Fortunately, models of successful digital project-to-product transformations do exist. To understand what works, the author has conducted field research and co-authored several case studies (listed in Appendix A, which describes the research methodology) and, in the process, has engaged with dozens of senior executives who have led successful transformations. From this research, he has created a set of principles and practices that are at the core of any successful effort to become a digital-product-led, and by extension, a digital-first organization. The following presents case studies of two companies (CarMax and *The Washington Post*) that have successfully transformed from an IT project mindset to managing digital products. The article

6 Peppard, J. and Bastion, R. M. "The Hidden Causes of Digital Investment Failures," *MIS Quarterly Executive*, (forthcoming).
7 *Chaos Report 2022*, The Standish Group, 2022.
8 Sessions, R. *The IT Complexity Crisis: Danger and Opportunity*, OpenWatch, October 22, 2009.

Table 1: Digital Project-Oriented Management vs. Product-Oriented Management

	Project-Oriented Management	Product-Oriented Management
Budgeting	Funding project milestones, predefined at project scoping. New projects require the creation of a new budget.	Funding of product value streams based on business results. New budget allocation based on demand. Incentive to deliver incremental results.
Time Frames	Defined project end date (e.g., one year). Not focused on maintenance/health after the project ends.	Multiyear product lifecycle. Includes ongoing health/maintenance activities through end of life.
Success	Measured in *outputs* (e.g., meeting requirements, being on time and on budget). Businesses incentivized to ask for everything they might need up-front.	Measured in *outcomes* (e.g., meeting objectives and key results). Focus on incremental value delivery and regular checkpoints.
Risk	Delivery risks, such as product/market fit, are managed by forcing all learning, specification and strategic decision-making to occur up-front.	Risk is spread across the lifecycle and iterations of the product. This creates option value, such as terminating the product if delivery assumptions are incorrect or pivoting if strategic opportunities arise.
Teams	People assigned to the work; people are allocated up-front, with individuals often spanning multiple projects; frequent churn and reassignment.	Work assigned to people; stable, incrementally adjusted, cross-functional teams assigned to one value stream.
Visibility	IT is a black box. Project management offices (PMOs) create complex mapping and obscurity.	Direct mapping to business outcomes. Value management offices (VMOs) enable transparency.

Adapted from Kersten, M. Project to Product, IT Revolution, 2018, p. 54.

then provides recommendations for other organizations about to embark on a similar transformation.

How CarMax Transformed to Digital Product Management

> *"When we set out on our digital transformation, we had one simple goal: position our company for rapid change to deliver exciting, differentiated and industry-leading experiences for our customers. … As used auto consumer behaviors began to evolve, we knew we needed to disrupt ourselves and change how we work, think and operate…. We adopted a data-driven and product mindset [and] we embraced the concept of rapid experimentation as the cornerstone of our transformation."* Shamim Mohammed, Executive Vice President and Chief Information and Technology Officer, CarMax

CarMax was established in 1993 as "just a test" by the now-defunct electronic giant Circuit City. In its own words, "CarMax revolutionized the auto industry by delivering an honest, transparent, and high-integrity car buying experience" to its customers. Despite growing into the largest used-vehicle retailer in the U.S., operating 240+ stores in more than 100 markets nationwide, the memory of its parent company's untimely demise remains fresh in the company's mind—particularly when faced with digital-first competitors such as Carvana, Vroom, Shift and others.

During the early 2000s, CarMax operated like many successful Fortune 500 companies. It prepared annual roadmaps and budgets, and prioritized improvement initiatives based on business cases supported by ROI projections, level-of-effort estimates and resource requirements. These initiatives were driven by senior executives who could spend months developing and pitching their ideas, hoping to earn a spot in the organization-wide

prioritization of projects. Ann Yauger, assistant vice president of Product Management, recalled:

> *"It was all done with the assumption that senior executives in the business should make the big decisions, and that whatever we decided would be the right thing. At that point, the budget would be set for the year and project teams would be committed to build what we had requested, potentially months [earlier]."*

Recognizing the Need and Preparing for a Digital-Product-Oriented Approach

CarMax's approach to IT project management started to change in 2008, when it began adopting Agile practices and more sophisticated procedures for usability testing. However, its IT planning, budgeting and decision-making processes were still very much Waterfall-oriented.[9] Despite becoming more agile in how it developed software, CarMax's overall project- and portfolio-management process continued to launch products with mixed results, including products that landed in what was termed "the thud zone"—products that didn't hurt the business but that didn't significantly help it either.

> *"We found that we might overbuild an application—creating features that the end user didn't really need—but at the same time underbuild it because we couldn't scale it out to all of our markets. We wanted to move the business in new and exciting ways but needed a different process to be able to do that faster, leaner, and smarter."*
> Ann Yauger

The most significant inflection point happened in 2011 around the beginning of the lean startup movement[10] and the rise of "digital-native" companies like Facebook, Google and Amazon. In her role as the leader of CarMax.com, Yauger participated in an executive council (comprising two dozen executives from digital companies across the U.S.). Council members from several of the more digitally advanced companies opened her eyes to a better way to work. "We had this vision that we saw so clearly … that the company needed to make this transformation. We didn't need to just adopt a practice or process change, *we needed to fundamentally transform into a 21st-century, technology-driven product organization*," she said.

Following this input from council members, CarMax ran a pilot project in 2013 with a team of four people—giving them a problem to solve, a book on lean user experience and a six-week time box. The pilot quickly demonstrated how powerful this new way of working could be. The team was provided with a general problem statement (as opposed to a detailed set of requirements) and given complete freedom on how to solve it. The team began each week with what it thought was a great idea for solving the problem and then pivoted to something else at the beginning of the next week. Iteration by iteration, the team worked toward a better and better solution. Yauger recalled, "The engagement of the team was over the moon!"

CarMax then brought in Marty Cagan, consultant and author of one of the classic, and still relevant, books on digital products.[11] He provided some timely expertise and workshops on how to manage digital products. His input enabled CarMax to improve and expand what it had learned through the pilot.

The company quickly realized it needed additional resources, including more people who could do digital product management in a serious way (such as user experience designers, delivery managers and web analysts who were also data miners). CarMax assessed existing personnel against the new skillsets that it needed, which forced it to make some hard choices. It also had to rethink the underlying IT architecture and figure out how to move toward "DevOps," another new movement that was gaining traction in

9 With the Waterfall project-management approach, a project is completed in distinct stages and moved step by step toward ultimate release to consumers. For more details see Olic, *A. Waterfall Project Management Methodology*, ActiveCollab, May 24, 2017, available at https://activecollab.com/blog/project-management/waterfall-project-management-methodology.

10 For a good primer on the lean startup movement, see Reis, E. *The Lean Startup*, Crown Business, 2011.

11 Cagan, M. Inspired: How to Create Tech Products Customers Love, 2nd edition, John Wiley & Sons, 2018. Other books by Marty Cagan include: 1) Cagan, M. and Jones, C. *Empowered: Ordinary People, Extraordinary Products*, John Wiley & Sons, 2021; and 2) Cagan, M. *Transformed: Moving to the Product Operating Model*, John Wiley & Sons, 2024.

Silicon Valley.[12] The overarching objective was to enable product teams to move iteratively with greater speed while releasing their products independently without bringing systems down. CarMax realized that to transform from an IT-project to a digital-product orientation; it had to learn how to "work differently" and needed people who could lead the transformation effort. Moreover, the transformation could not be achieved in one go—it would need to be staged.

A staged change effort of this magnitude would take time and require buy-in from the company's senior team. To ensure the necessary buy-in, CarMax appointed a new senior vice president of strategy and transformation, Ed Hill, in 2013 (he became chief operating officer in 2018), a new chief information and technology officer (CITO), Shamim Mohammad (appointed in 2014), and a new chief marketing officer, Jim Lyski (appointed in 2014). They championed the new digital-product-oriented approach and recognized the value it provided to CarMax. Lyski recalled:

> *"We saw the vision that the best way to lead is through a customer-centric product approach. Because we're a retailer, we're an experienced brand, we really don't have products, per se—but we took a close look at how the Silicon Valley approach to product is really about continuous innovation. We started with some small examples of how this can work that we thought would be very quick to market. One of the early wins was digital merchandising—taking better pictures and describing the cars better online. We saw an immediate increase in sales. That was an early win. We took the customer-facing pieces first, which we could see impacting the marketplace—even though behind the scenes, it was what we call a minimal viable product that is not fully developed yet—but we had to get those early wins, those early points on the board, and ensure that our senior team saw the value, because it was going to [require] a ton of resources and take a lot of time."*

Senior leaders set up demo opportunities for the emerging product teams to show the board the value of this new way of working. Product teams also gave presentations to Wall Street analysts at CarMax's regular in-house events to help them understand the transformation from an operational perspective. Analysts began to describe CarMax as "on offense, not defense" and "an innovator in addition to being operationally strong." Bryan Ennis, vice president of Product, added:

> *"The early wins were good for two significant reasons: proving that the new way of working drove innovation and delivered it with speed and quality at the same time. And it also showed how we should probably organize ourselves in the long term."*

Across the company, the emphasis shifted toward team empowerment and a mindset of failing fast, as long as CarMax was learning from the failures and moving forward in significant ways. Interestingly, the hardest challenge was retraining leaders in how to lead and stakeholders in how to be stakeholders in a company focused more on digital products than IT projects. The new role of leaders was to set the overarching strategy and be crystal clear on the goals they wanted to achieve, clearly defining what success would look like using an Objectives and Key Results (OKR)[13] framework while empowering product teams to deliver those results. (An example of an OKR goal is "We need to get more tier-1, high-value customers to buy from us, and I want to see a 2% increase in category X.")

Over roughly a 10-year period, CarMax networked outside of its industry (via the executive council), conducted pilots, drew on external expertise (such as Marty Cagan's), leveraged advocates in influential places and managed the change process by publicizing early wins. Along the way, the company also learned how to build a new organizational structure and

12 DevOps is the practice of software development and operations engineers participating together throughout the entire service life-cycle, from design to the development process to production support. For information on DevOps, see Mueller, E. *What Is DevOps?*, The Agile Admin, August 2, 2010, available at https://theagileadmin.com/what-is-devops/.

13 Objectives and Key Results (OKRs) is a goal-setting framework used by individuals, teams and organizations to define measurable goals and track their outcomes. The development of the OKR framework is generally attributed to Andrew Grove who introduced the approach to Intel in the 1970s.

a new product management process, as described below.

Building a Digital-Product-Driven Organization

Tom Giedgowd, director of Product Management, described CarMax's digital product teams: "We refer to product teams in the Silicon Valley sense of the term—a team that is responsible for building a technology-driven experience that is valuable for our customers and valuable for the business." At the center of the product teams is what CarMax refers to as the core team, comprising three different roles:

- **The product designer:** Responsible for understanding the customer problem space, which involves conducting user research, user interviews and surveys. In the solutions space, product designers work in a lean way to rapidly prototype many different ideas on visual design, interaction design and process design.
- **The lead developer:** Responsible for ensuring that whatever the team conceives is feasible to build and scale, using DevOps best practices. If the team needs to partner with any other groups within the organization from a technical perspective, the lead developer acts as a team ambassador.
- **The product manager:** Responsible for making sure the team focuses on an area of opportunity for the business, and that whatever the team decides to do drives business value as well as customer value. The product manager is often the external face of a product team, responsible for tracking product strategy and key performance indicators (KPIs).[14]

In addition to the core team, a complete product team comprises members fulfilling several other important roles:

- **Marketing creative services:** Responsible for any internal or external product marketing, such as radio, TV or paid search ads.
- **Delivery managers:** Responsible for making sure the product team delivers the product on time, as well as clearing roadblocks caused by any dependencies that the team might have with other teams (analogous to the role of scrum master in Agile software development).
- **Field experience experts:** Responsible for helping the product team "know the customer" by doing research in the stores, prototyping in stores, ensuring that products are scalable across all the stores, making sure employees are trained appropriately before a product is rolled out to a store and ensuring that product launches are properly communicated. This role also creates a feedback loop from the field and differentiates CarMax from a lot of other pure technology companies.
- **Functional experts:** Provide subject-matter expertise. For example, an expert on auto financing was embedded within the finance product team and knew all the nuances of used-car finance (e.g., rates, terms, laws and stipulations).
- **Developers:** Code software in compliance with best practices, such as DevOps, Agile and quality assurance.
- **Data scientists:** Responsible for measuring actual business outcomes. Their role is critical for gaining visibility into what impact the product team is having on the business. For example: Is the product driving sales? Is it helping CarMax buy more cars? Is it helping CarMax acquire more customers?

Product vice president Bryan Ennis described CarMax's digital-project-oriented organizational structure:

> *"We're organized as a product organization across the customer journey. It's been a massive transformation because you're bringing all your technology, all your delivery, all your analysts, all your product managers, all your designers … into a common way of working."*

14 In the context of product management, KPIs are broader than the KPIs that have been used for many years by IT organizations. In this context, a key performance indicator is "a measurable value that demonstrates how effectively a company is achieving key business objectives. Organizations use KPIs at multiple levels to evaluate their success in reaching targets. High-level KPIs may focus on the overall performance of the business, while low-level KPIs may focus on processes in departments such as sales, marketing, HR, support and others." For a detailed description of business-related KPIs, see *What Is a KPI?*, Klipfolio, available at https://www.klipfolio.com/resources/articles/what-is-a-key-performance-indicator.

While traditional project teams are temporary, product teams are durable—staying in place throughout the life of a digital product. For example, there was no end date for the work of the online finance product team. It was constantly working in this space to optimize, find or create new online finance products. Tom Giedgowd added: "The finance product team's job would only end when the vice president of Product says, 'I think we've got all the juice out of the orange in the finance space—why don't you guys focus elsewhere in the business?'"

Another significant characteristic of the digital product teams is that they are not merely "order takers" but are empowered to act autonomously. Historically, IT project teams fulfilled requirements dictated to them by their executive sponsors. This resulted in a very output-oriented mindset. CarMax had attempted to reverse this way of working. As Tom Giedgowd explained:

> *"My conversation with the executive isn't 'Mr. or Mrs. Executive, please tell me what to go [and] build;' it is 'let's talk about where you want to see your area of business two years from now. What sort of metrics do you want to drive? Do you want to increase credit applications? Do you want to capture higher-FICO customers? Do you want [to] increase profitability? What is it that you want to do from a business outcome perspective?'"*

This outcome-oriented, value-focused mindset results in conversations focused on business objectives rather than "tell-me-what-to-build" conversations. The product manager's role is to partner and work with stakeholders, figure out what business objectives to go after and set the KPIs—for example, "We need to increase online credit applications from high-FICO [Fair Isaac Corporation credit score] customers by 20%," The team is empowered to determine how it will achieve these goals. In this example, the product designer might say "We have a goal to increase credit applications from high-credit-quality customers by 20%. What are all the ways we could do this? We could create a bot that gets people to submit applications or we could introduce another growth-hacking technique." There are a multitude of ways of rapidly prototyping and testing ideas to quickly figure out which tactic would best achieve the goal, and then the team can build the solution. This outcome-driven mindset became the principal way that CarMax executed its business strategy.

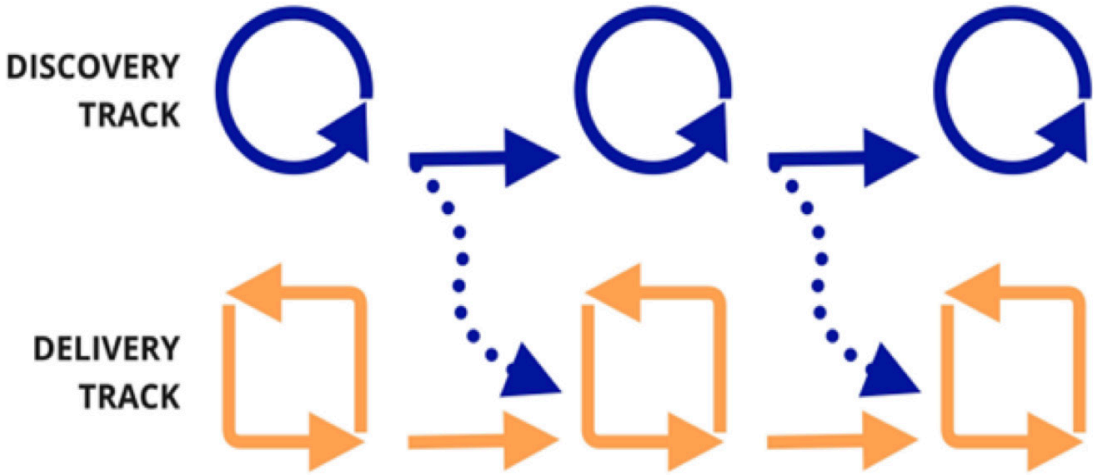
From a digital-product-management perspective, CarMax used a variant of Agile development called dual-track Agile. The original Agile method was designed to deliver a working product every two weeks. Though this approach ensured a faster, more regular delivery cycle, it did not ensure the delivery of valuable software that would solve a business problem. As shown in Figure 1, to address this shortcoming CarMax overlaid the delivery track of the Agile method with the "discovery track"—a parallel process that leveraged design thinking principles (e.g., empathy interviews and maps[15]). This dual-track Agile approach enables CarMax to figure out the right thing to build from the customer and business perspectives.

While the lead developer and two or three others are developing and delivering software in two-week sprints, the product designer is running experiments—for example, she might do a demand test on the website, rapidly prototype a new login page or create a low-fidelity prototype based on research gleaned from conducting a user interview or a survey. Often, the ideas do not work as planned and the prototype is abandoned, but the product designer avoids spending months building something that doesn't achieve the intended outcomes. Anything that works in the discovery track is moved to the delivery track. This accelerates the rate at which new ideas can be tested while simultaneously increasing the chances that something of value will be created.

Usually, all three members of the core team are involved in the discovery process, though sometimes it might just be the product manager and product designer. In addition, a field experience expert would be included if the product involves the stores, and creative services would be involved if the product requires a marketing campaign. The product manager chooses who will be involved in the discovery and delivery processes depending on the context and desired outcome or product.

15 For a great primer on empathy interviews and maps, see Gibbons, S. *UX Mapping Methods Compared*, Nielsen Norman Group, November 5, 2017 available at https://www.nngroup.com/articles/ux-mapping-cheat-sheet/.

Figure 1: Dual-Track Agile



By 2023, CarMax had 80+ digital product teams and had earned a coveted spot on the 2023 CIO 100 Award list for being an early adopter of generative AI. With help from Microsoft's Azure OpenAI service, a CarMax product team streamlined the creation of text summaries for its car research pages to provide customers with quick and meaningful content. This effort led to a spike in page views and boosted the pages' search engine rankings, which drove substantial business growth.[16]

Appendix B shows screenshots from CarMax's website, with annotations to highlight four examples of customer-facing digital products (Search, Pre-Qualification, ChatBot "Skye" and Instant Offer) along with the associated KPIs. It is important to note that each of these digital products comprises a combination of people, processes, data and technology, which together deliver the entire end-to-end customer experience. Note also that the Instant Offer digital product includes a blend of both online and offline experiences (e.g., when the customer brings their car into a dealership to sell or trade in).

Of course, CarMax also has many internally facing digital products. For example, the Order Processing product supports CarMax associates in the sale of a vehicle to a customer—including trade-in, payoff, financing and MaxCare—with the primary KPI being the number of vehicle sales.

How The Washington Post Transformed to Digital Product Management

"Jeff Bezos [who purchased The Washington Post in 2013] is a man who understands and believes in product development. He's always encouraged us to innovate and invent and not worry too much about having the full business plan figured out before we start building. He wants to see us constantly make our [web]site faster, lower the cognitive dissonance of the news-reading experience … you name it, and Jeff pushes on it, and he's excited about it. My developers talk to him, my product managers talk to him and my designers talk to him. We love the fact that he is a product guy." Shailesh Prakash, Executive Vice President and Chief Information and Technology Officer, *The Washington Post*

After joining *The Washington Post* in 2014 as publisher and CEO, Fred Ryan worked with

16 For a description of how a CarMax digital product team used Generative AI to drive business value, see Rooney, P. *CarMax Drives Business Value with GPT-3.5*, CIO, May 5, 2023.

owner Jeff Bezos to bring about an extraordinary transformation within an industry that has been a poster child for disruption and decline. As a result of Ryan and Bezos's efforts, the nearly 150-year-old institution has become a consistently profitable and growing business. The turnaround had been nothing short of miraculous, leading Fast Company (an American business and innovation magazine and website) in 2018 to rank *The Washington Post* as one of the world's most innovative companies "for bringing Amazonian ambition to news."

With the backing of a new leadership team, *The Washington Post* shifted first toward Agile and DevOps practices, while gradually replacing IT project teams with digital product teams. The results have been remarkably similar to CarMax's—a much nimbler company that leverages interdisciplinary product teams distributed throughout the organization. CEO, Fred Ryan explained:

> *"We continue to ensure that our speed of execution becomes an asset for us rather than a liability. When there is a competitive environment, we want to be able to execute faster than our competitors, so that we can do the deal, launch the product and be the first."*

Kat Downs Mulder, managing editor for digital (and formerly head of product) at *The Washington Post*, described the company's transformation as "a metabolism shift toward more creation, more invention and more embracing of new ideas and new technology." She contrasted the new digital product approach with the old IT project approach as follows:

> *"What doesn't work is just having people execute on an assembly line. You need the team to be engaged with formulating the roadmap and prioritizing things; otherwise, you just end up doing the stuff on a list. It's outcomes, not outputs."*

Shailesh Prakash, was adamant that a product-oriented approach was the best way to work:

> *"Every day of the week, and twice on Sunday, I'd prefer a model where the [software] engineers are directly engaged with their newsroom partners rather than having a layer of project managers in the middle who ... sort of think they know what's going on, while the actual doers are twiddling their thumbs saying, 'I'm sorry, what am I supposed to do again? I'm waiting for the order. What should I do?'"*

To help put the product-development mindset into action, *The Washington Post* adopted Agile software development and scrum practices. The result was that teams ("squads") worked together more efficiently on the things that mattered. Over time, dozens of different digital product teams were formed, each consisting of five to 10 members:

- The lead product manager
- One or more designers (user experience designer, visual designer or design technologist)
- One or more software engineers (front end, back end or hybrid)
- A scrum master (typically shared across multiple teams)
- Subject-matter experts as appropriate (e.g., analytics or A/B testing).

Kat Downs Mulder added: "One of our goals is to give them more autonomy and give them more power to experiment."

Product vision was communicated from the top via a vision statement giving the high-level objectives and how they would be measured (key results). Each digital product team then set out to execute those objectives by drafting OKRs for the team, which were then reviewed every two weeks for alignment with the company vision. Periodically, multiteam communication meetings were held to track progress against objectives and provide visibility into what all the product teams were doing. In addition, product roadmap reviews occurred once a month with the executive team. Mulder explained:

> *"The tricky part is that you really want empowered teams, but there are higher-level business and financial decisions that depend on what the product teams are doing ... and so there are moments [where] it has to be escalated a level, and so forth. ... I do think that it's really important to facilitate prioritization in order for people to have a really clear understanding of why you're choosing to do certain things."*

As a byproduct of embracing a digital-product mindset, *The Washington Post* became as much a tech company as it was a media company—achieving excellence in technology as well as journalism. CEO Ryan's take on this is:

> *"We talk about this intersection of journalism and technology; today, you have to be excellent in both. If the journalism is not excellent, it doesn't matter how good the technology is; and if the journalism is fantastic, but the technology is not getting it out, you're out of luck. So, we hired and expanded our [technology] engineering team."*

As noted by Ryan, achieving technology excellence meant hiring talented engineers, developing them through technical training programs and compensating them at market rates. In addition, with Bezos's encouragement, *The Washington Post* cultivated a culture of experimentation and rapid innovation, with both the newsroom and the reader experience in mind. The innovation mindset was underpinned by a technology strategy that emphasized build rather than buy, omnichannel with a strong emphasis on mobile and the early adoption of emerging technologies.

The strategic intersection of journalism and technology produced another form of digital transformation at *The Washington Post*—one typically only seen in digital-native companies based on the West Coast. Just as Amazon leveraged its engineering excellence to take advantage of cloud computing when it created Amazon Web Services, *The Washington Post* followed the same playbook to build a technology platform that became known as Arc XP (Arc because it spanned the arc of a publisher's needs and XP for "experience platform"). As reported by *Fast Company*, "The newspaper created a platform [Arc XP] to tackle its own challenges. Then, with Amazon-like spirit, it realized there was a business in helping other publishers do the same."[17] CITO Prakash remembers an off-site meeting where management discussed forming a "blue ocean strategy" by focusing on an adjacency that *The Washington Post* could develop so that it could win, as opposed to going head-to-head with the competition in its existing space. In this case, as Prakash said, the strategy was "To build technology for *The Washington Post* and then 'Arc-ify' it for other publishers."

Arc XP has become an extremely successful business, powering more than 1,500 sites for hundreds of clients in over 25 countries, with over 1.5 billion unique visitors to the platform and billions of page views every month, and is on track to generate $100 million in annual revenue for *The Washington Post*. To fuel this tremendous growth, *The Washington Post* now has over 250 technology engineers and plans to add 150 more.

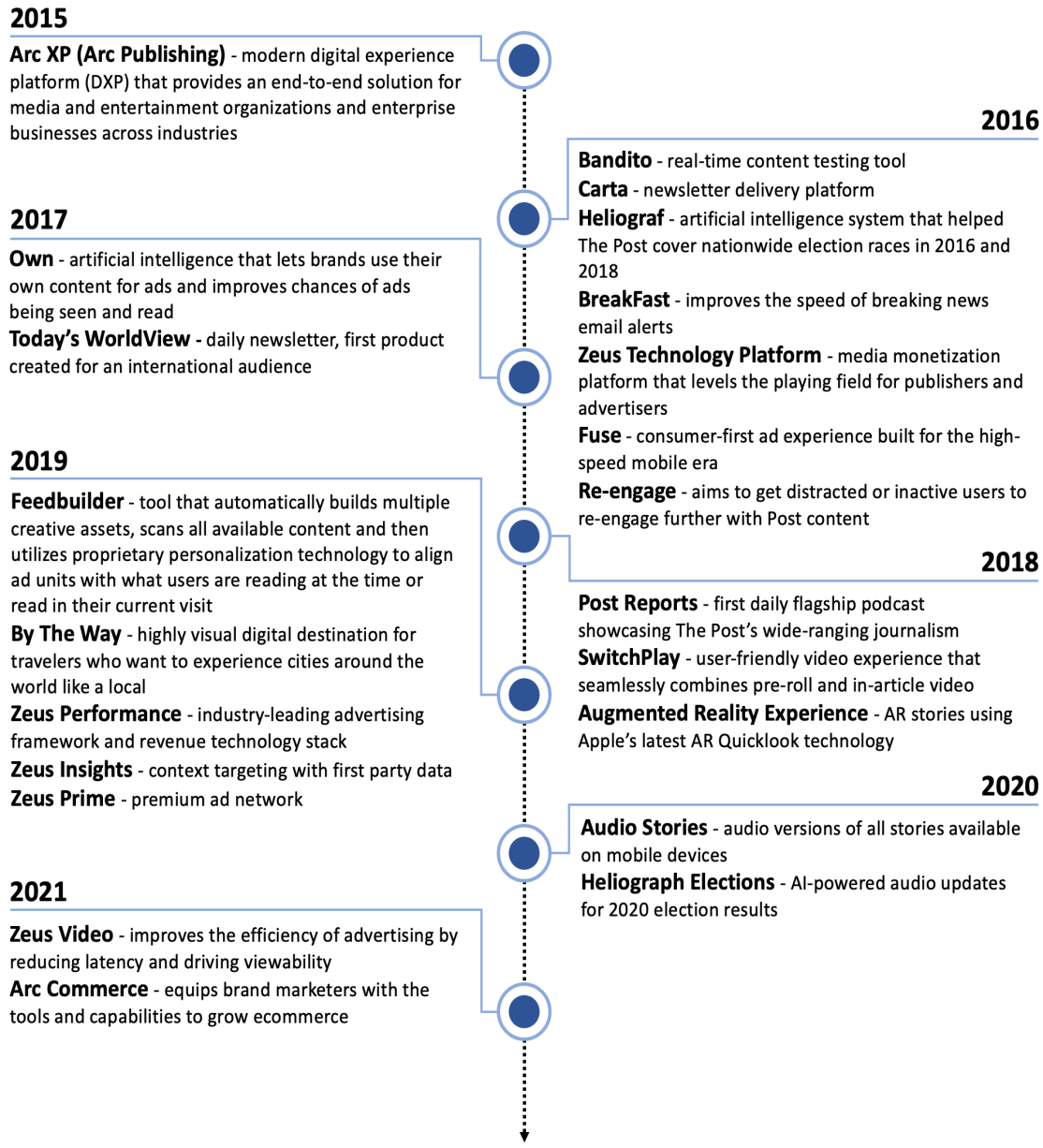
Though Jeff Bezos doesn't get involved in editorial content or the day-to-day running of the company, every two weeks he meets with the leadership team via phone to review process, product and technical issues, such as subscription flow and load time for the website. The frequent engagement with Bezos has been a catalyst for recruiting and retaining hundreds of top technologists—many of whom would have otherwise taken jobs with technology companies like Facebook, Google and Microsoft. *The Washington Post* has leveraged this talent to release a range of industry-leading digital products (representative examples launched between 2015 and 2021 are shown in Figure 2). And more recently, in May 2023, Fred Ryan announced the company had established two cross-functional teams focused on harnessing the power of generative AI to support journalists and transform the way consumers receive news and information.

Recommendations for Transforming to Digital Product Management

Both CarMax and *The Washington Post* fundamentally rewired the way they operate—more specifically, the way they plan and execute the delivery of digital solutions. Each company realized the project-oriented approach wasn't working for a significant portion of their IT initiatives. Their project teams had focused only on delivering user requirements to a predetermined schedule and budget that all too often produced products that didn't meet

17 McCracken, H. "The Washington Post Is a Software Company Now," *Fast Company*, November 17, 2017, available at https://www.fastcompany.com/40495770/the-washington-post-is-a-software-company-now.

Figure 2: The Washington Post's Digital Product Launch Timeline, 2015-2021, Representative Examples



expectations. Moreover, both organizations realized that Agile, scrum, and DevOps practices weren't effective because they were being held back by a top-down, project-driven organizational framework (e.g., budgeting cycles, the prioritization process and success measurement).

They formed new playbooks based on the lessons learned from studying the literature on product management (many of which are referenced in footnotes in this article) and digital-native companies. Based on these two cases, and others undertaken by the author, there are four overarching recommendations (described below) for successfully transforming from digital-project management to digital-product management. Within each recommendation, there are

Recommended Best Practices on the Journey Toward Becoming a Digital-Product-Oriented Organization

1. Start small and scale up: Taking account of the differences between digital project and product management set out in Table 1, identify an initiative that has the potential to benefit from a product-oriented approach. Focus on one or two teams and give them the resources and support they need to succeed. Once you can demonstrate the value of this approach, scale it up to other areas of your business.

2. Create a product vision: Start by defining the high-level objectives of your digital products and how you will measure them. Communicate your vision to your product teams and work with them to set specific goals and key performance indicators.

3. Form complete, durable, empowered product teams: Product teams should comprise a product manager, one or more product designers, a sufficient number of technology engineers and other important team members, such as delivery managers, subject matter experts, developers and data scientists. Unlike project teams, digital product teams should be formed to work together for the life of a product, and should include technology engineers as members of the core product team from the very beginning. Give your digital product teams the autonomy to make decisions about how to achieve their goals. Ensure that they have access to the resources and support they need to be successful.

4. Use dual-track Agile and DevOps practices: A dual-track Agile approach enables the discovery of the right thing to build from both the customer and business perspectives, while also delivering software in short sprints. Encourage experimentation and rapid innovation using a build-test-learn approach.

5. Hold regular reviews to track progress and cross-pollinate: Regular reviews (e.g., retrospectives, open houses and/or meetings with the executive team every two weeks) should be held to track progress against objectives, ensure alignment with company vision and share important information across product teams.

principles and practices crucial for successful transformation.

1. Understand that Transformation Is a Journey—It's Not a Project

> *"The biggest obstacle in my mind is that it requires courage and a long-term commitment to make that transformation, because it is a journey—it's not like 'project world,' where you do two or three big projects that will look really cool and you're done. It is a way of thinking, and it is a way of doing things forever that requires a major shift in mindset that some people do not understand. That's the first big obstacle companies really need to think about—it is a new way of doing things and you're not going back."* Shamim Mohammed, Executive Vice President and Chief Information and Technology Officer, CarMax

Change initiatives of this magnitude require the complete buy-in of top management. It's not a coincidence that both CarMax and *The Washington Post* initiated their multiyear transformations following leadership changes at the top. In each case, leadership teams identified performance (*The Washington Post*) and opportunity (CarMax) gaps and a clear vision for transformational change.[18] The recommended practices for the journey from an IT project orientation to managing digital products are set out in the text box above.

The success of a digital-product-oriented management approach depends on the active engagement of all key stakeholder groups. As described above, CarMax and *The Washington Post* created opportunities for product teams to give demos to the board, make presentations to Wall Street analysts and provide product updates at regular in-house events to help key stakeholders gain an operational-level understanding of the transformation from digital projects to digital products. A product-oriented management approach requires changes in organization structure, strategic planning and funding processes, and also in the way work gets done and the policies and rewards governing it.

18 For an excellent primer on transformational change, see: Raffaelli, R. *Organizational Behavior Reading: Leading Organizational Change*, Core Curriculum Readings Series, Harvard Business Publishing 8325, 2017.

2. Use Digital Product Teams to Create Ongoing Alignment Between IT and the Business

As noted in "*The 2023 SIM IT Issues and Trends Survey*" (also published in this issue of *MIS Quarterly Executive*), the alignment of IT with the business was the top IT management issue for organizations in 2023. Cross-functional product teams enable continuous alignment by transparently prioritizing and pursuing digital initiatives that deliver the most value to the business. The CarMax and *The Washington Post* cases show that digital product teams bring together individuals with a rich and varied combination of skills and perspectives. Having representatives from across the different functions results in:

- **Shared vision and objectives:** One of the core purposes of cross-functional teams is to align goals. When business and technology professionals sit together, they can define unified objectives that take technological feasibility, usability and business value into account.
- **Jointly defined success metrics:** Having clear metrics—whether they be ROI, user engagement or system performance—helps in setting and managing expectations.
- **Streamlined communication and faster decision-making:** With all stakeholders in one (ideally co-located[19]) team, communication becomes more direct and efficient. There's a reduction in the possibility of information loss or misinterpretation that might occur when communicating across separate teams or departments. Moreover, if the team is properly empowered, there's no need to go back and forth between departments or up and down the chain of command.
- **End-to-end product development:** Having a digital product team that covers every aspect of the product lifecycle—from idea creation and design to development, maintenance and continuous improvement—ensures that the product is well-rounded and meets both business and user needs throughout its lifetime.

In combination, these four advantages of multifunctional digital product teams, together with using the dual-track Agile method to deliver digital products, are what achieves continuous alignment. Shailesh Prakash, CITO at *The Washington Post*, emphasizes that "The product is the business. If it's truly a product-driven organization, the product manager is the de facto CEO for whatever they are working on." Shamim Mohammad, CarMax's CITO, has a similar perspective: "There's no such thing as 'IT and business.' IT is business. Business is IT. What the [digital] product approach does really well is bring the two areas together. So, you're no longer trying to align two different entities, because you are integrating the two entities into the teams to achieve shared goals and accountability."

3. Escape the Build Trap by Managing for Value Delivery

Melissa Perri defines the "build trap" as organizations becoming stuck in measuring their success by outputs rather than outcomes[20]—i.e., they focus more on developing features rather than on the actual value those features produce. She positions digital products as "vehicles of value." They deliver value repeatedly to customers and users, without requiring the company to build something new every time. This thinking leads to the concept of a value stream—the end-to-end set of activities, stakeholders, processes and tools required to deliver business value to the customer. The idea of shifting the underlying organizational structure and processes from supporting digital projects to supporting digital products suggests that the way IT work is funded and the way in which technology/business teams are organized facilitate a rapid response to user feedback and changing market conditions.[21]

19 In Cagan, M. op. cit., 2018, Marty Cagan emphasizes the importance of close collaboration and communication among product team members. He believes that having the team physically located together greatly enhances the speed and quality of communication, which in turn improves decision-making and problem solving. He acknowledges that while modern tools help with remote communication, there are unrivaled benefits in having product teams sit together because co-location fosters a deeper understanding, immediate feedback loops and a stronger team dynamic.

20 Perri, M. *Escaping the Build Trap: How Effective Product Management Creates Real Value*, O'Reilly Media. Inc., 2019.

21 For a primer on value streams, see: Kersten, M. *Project to Product*, IT Revolution, 2018, pp. 70-71.

To escape from the build trap, organizations, both in the private and public sectors,[22] will need to move away from the traditional project management office (PMO). A classic PMO is too closely wedded to the management models popular in the 1950s and to the Waterfall development approach still prevalent today. Instead, to embrace transformation and stay relevant—or even continue to exist in an agile, digital-product-led world—organizations need a different approach. Some are shifting away from PMOs toward value management offices (VMOs)—small, cross-functional, cross-hierarchy teams that consist of key representatives who work collaboratively across the organization to drive change and ensure the flow of value to customers.[23] Others have adopted new frameworks (e.g., the flow framework and value stream networks) as the key infrastructure concepts needed to bring about the same kind of automation and visibility for software delivery that we see in manufacturing.[24]

4. Understand Which Applications Are Best Suited for a Product Rather than Project Approach

To be clear, though projects are being deemphasized in digital-product-led organizations—particularly for customer-facing applications—there will still be a need for digital projects. Project management will continue to be important for initiatives that have a concrete set of goals, where time, people and expenses must be tracked in a systematic way. Set out below are recommendations for deciding whether applications should be managed as projects or as products.

Project-based applications: The following types of IT applications are best managed on a project basis:

1. **Short-term initiatives:** Applications or initiatives that serve a temporary need, like an app for a one-time event or conference or experimental or proof-of-concept applications designed to validate an idea or technology but not intended for long-term use or evolution.
2. **Migration or upgrades:** Moving from an old system to a new one, or a major version upgrade of an existing software system, where the objective is primarily the transition itself (sometimes referred to as a "lift and shift"), with no new value proposition. For example, CarMax migrated from the AWS to Azure cloud computing platform.
3. **Internal tools with limited scope:** Tools built to address a specific internal business need which, once built, require minimal changes or updates.
4. **Compliance or regulatory projects:** Software initiatives aimed at ensuring the organization complies with a new regulation, standard or law. For example, CarMax designed a system to help its dealerships in California comply with the California Consumer Privacy Act.
5. **Contract-based work:** The work-for-hire business is driven by contracts that each represent a project with a defined scope and budget (see the WillowTree case mentioned in Appendix A for an example of how IT project and digital product management can be blended).

Other examples of project-based applications include building a server farm and/or network modernization.

Product-based applications: The following types of IT applications should be managed on a product-management basis. Note, however, that these digital products operate on the technical infrastructure that was constructed using a project-based approach.

1. **Consumer applications:** Software products intended for the mass market, like mobile apps, which require regular updates, feature enhancements and maintenance based on user feedback.
2. **E-commerce platforms:** Online shopping platforms that need to be constantly updated in response to changing user preferences, market trends and technological advancements.
3. **Core business applications:** Applications that play a critical role in the daily

22 For a description of the current state of digital product management in the public sector, see: Pahlka, J. *Recoding America: Why Government Is Failing in the Digital Age and How We Can Do Better*, Metropolitan Books, 2023.

23 Augustine, S., Cuellar, R. and Scheere, A. *From PMO to VMO: Managing for Value Delivery*, Berrett-Koehler Publishers, Inc., 2021.

24 Kersten, M. op. cit., 2018, Chapter 3.

operations of an organization and need to be continuously improved.

4. **Platforms with user communities:** Applications that have a community of users who contribute content, like social media platforms, which evolve based on user needs and feedback.
5. **Subscription-based services:** Applications where customers pay on a recurring basis usually require continuous updates, enhancements and customer support to retain subscribers.

It's important to note that the above provides general categorizations of applications best suited for a project management or product management approach. The decision on which approach to use for a digital initiative should be based on the specific context, objectives and long-term vision for the application. Bear in mind, though, that the modern trend in software development favors a product mindset even for traditionally project-based initiatives because it promotes continuous improvement and value delivery.

Concluding Comments

In *Future Shock*, published in 1970,[25] technology futurist Alvin Toffler suggested that we need to change the way we run organizations to make them more capable of continual adaptation in fast-changing and complex environments. Toffler defined future shock as a malaise in which we get so psychologically and systemically overwhelmed by change that we experience a kind of societal motion sickness, or collective nausea. He famously wrote:

> *"The increasingly unstable environment demands more and more non-programmed decisions down below; the need for instant feedback blurs the distinction between line and staff; and hierarchy totters. Planners are too remote, too ignorant of local conditions, too slow in responding to change. As suspicion spreads that top-down controls are unworkable, plannees begin clamoring for the right to participate in the decision-making."*

Digital product teams offer a means of protecting organizations from future shock: pushing decisions as close to the work as possible, seeing the autonomous product team as the unit of delivery, and integrating learning and doing into rapid cycles of iteration.[26] Shamim Mohammad, CarMax's CITO, has emphasized the importance of being nimble:

> *"I do not know how the world is going to be in three or four years. What I am trying to do … is position [CarMax] so that we are ready … [to] be nimble, agile, and responsive [to changes]: an organization that can move quickly. I have to position [CarMax] to be that nimble company."*[27]

> *"Our focus is on building platforms that allow us to change quickly, allow us to scale quickly, allow us to provide different experiences quickly. … We moved away from traditional project-based annual planning cycles where you have requirements. It doesn't work because things change so fast."*[28]

In summary, by following the lead of companies like CarMax and *The Washington Post*, organizations can achieve greater agility, faster time-to-market and increase their chances of avoiding future shock by leveraging digital product teams that are decentralized, empowered and stable. Transforming to a digital-product mindset has provided them with the ability to pivot their business models and processes in response to new competitors entering their markets, changes in consumer behavior, new technologies or even another pandemic.

Appendix A: Research Methodology

A qualitative field-based research method was adopted for this study, with dozens of senior executives interviewed between 2019 and 2023. These interviews were conducted in person, over

25 Toffler, A. Future Shock, Random House, 1970.

26 A related article that explores how to deal with future shock is Plunkett, J. *How to Cope with Future Shock, Medium*, May 15, 2023.

27 Adapted from High, P. A. *Getting to Nimble: How to Transform Your Company into a Digital Leader*, Kogan Page, 2021, p. 28.

28 Quote from Sayer, P. *CarMax's Product-Based Approach to IT Pays Off*, CIO, February 1, 2021.

the phone and via videoconferencing platforms (Zoom and Microsoft Teams), depending on the convenience and preference of the participants. The objective was to gather in-depth insights into the executives' perspectives, experiences and decision-making processes. The semi-structured interviews allowed for both predefined questions and the flexibility to explore emerging themes. All interviews were transcribed verbatim and subjected to a rigorous content analysis process, ensuring that the data was systematically organized, coded and interpreted in accordance with the research objectives.

The CarMax and *The Washington Post* case studies reported in this article are based on the following previously published cases co-authored by Ryan Nelson:

CarMax

Nelson, R. and Wright, R. *CarMax: Driving What's Possible (and Teaching Note)*, 2019, Harvard Business School Publishing (UV7842-PDF-ENG).

Ross, J., Beath, C. and Nelson, R. *Redesigning CarMax to Deliver an Omni-Channel Customer Experience*, June 2020, MIT CISR Working Paper, No. 442.

Ross, J., Beath, C. and Nelson, R. *The Digital Operating Model: Building a Componentized Organization*, MIT CISR Research Briefing, June 2020, Vol. XX, No. 6.

Grazioli, S. and Nelson, R. *CarMax: Building the Omnichannel Capability*, 2020, University of Virginia, McIntire School of Commerce.

The Washington Post

Nelson, R. and Miner, K. *Digital Transformation at The Washington Post: Innovating for the Next Generation (and Teaching Note)*, 2022, Harvard Business School Publishing (UV8443-PDF-ENG).

Other Case Study Material

The findings in this article also draw on two other cases published by the author, one on Capital One and the other on WillowTree:

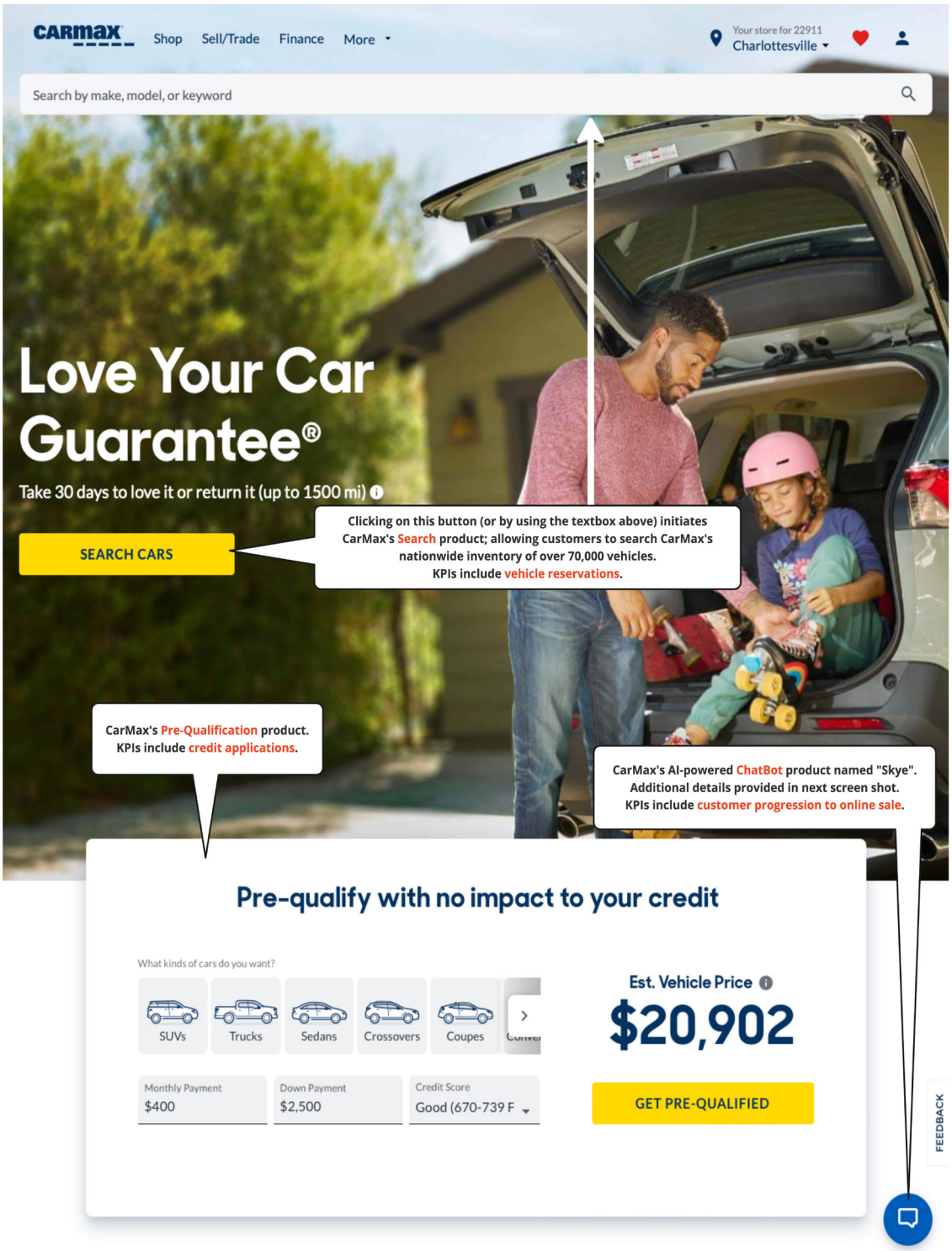
Nelson, R. and Daum, O. *Project to Product: Lessons from Capital One*, 2023.

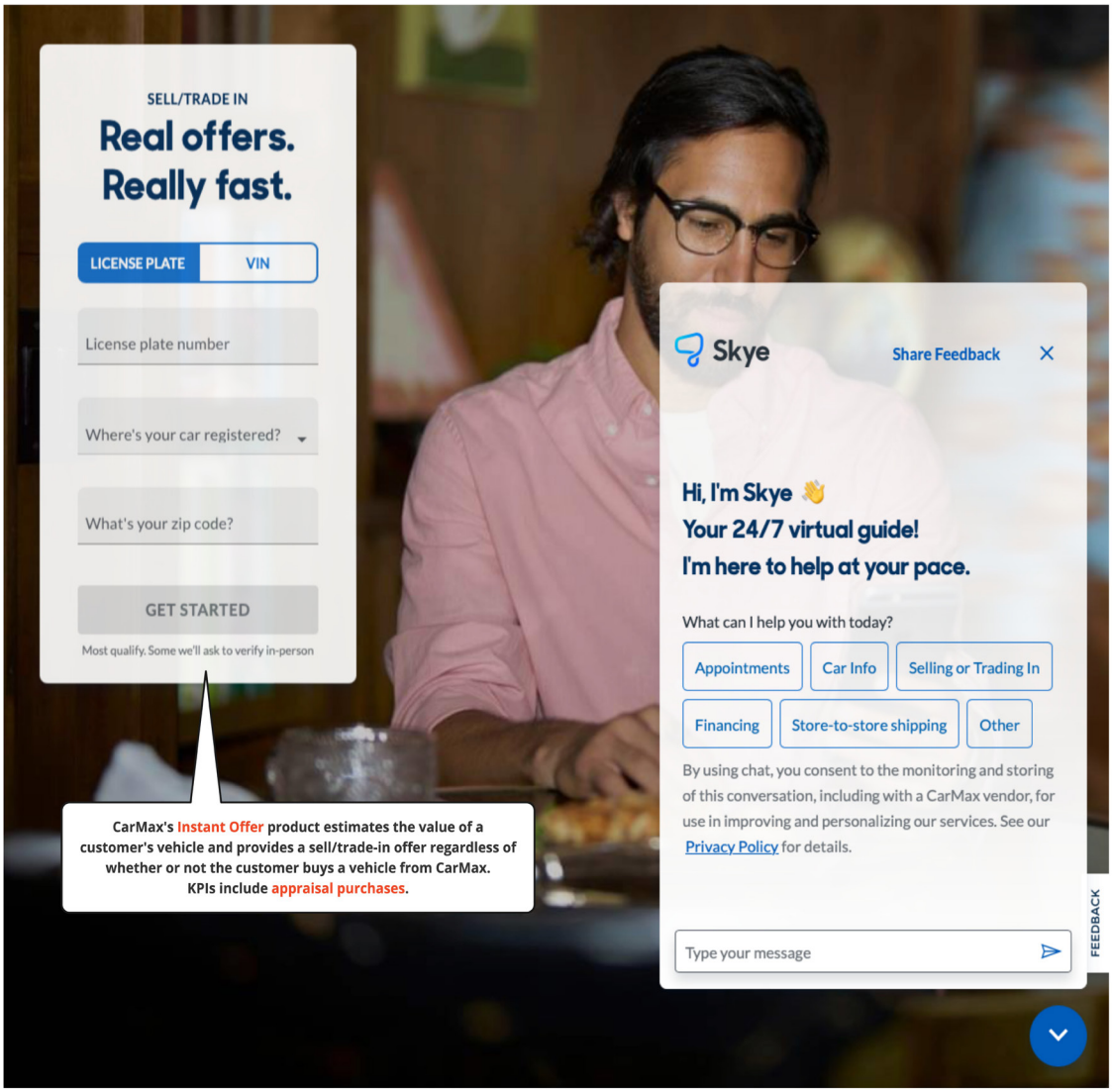
Nelson, R. and Wright, R. *WillowTree: Project Driven with a Product Mindset (and Teaching Note)*, 2021, Harvard Business School Publishing (UV8163-PDF-ENG),

Product Management Resources

The author also drew on the Center for the Management of IT's *Product Management Resources*, available at https://www.commerce.virginia.edu/centers/cmit/product-management-resources.

Appendix B: Examples of Customer-Facing Digital Products at CarMax





About the Author

R. Ryan Nelson

Ryan Nelson (rnelson@virginia.edu) is the Murray Research Eminent Professor of Commerce and Director of the Center for the Management of IT at the McIntire School of Commerce, University of Virginia. He has published articles, cases and books on project management, digital product management and IT adoption in a variety of academic and professional journals, including *MIS Quarterly Executive*, *MIS Quarterly*, *Journal of Management Information Systems* and *Journal of the Association of Information Systems*.