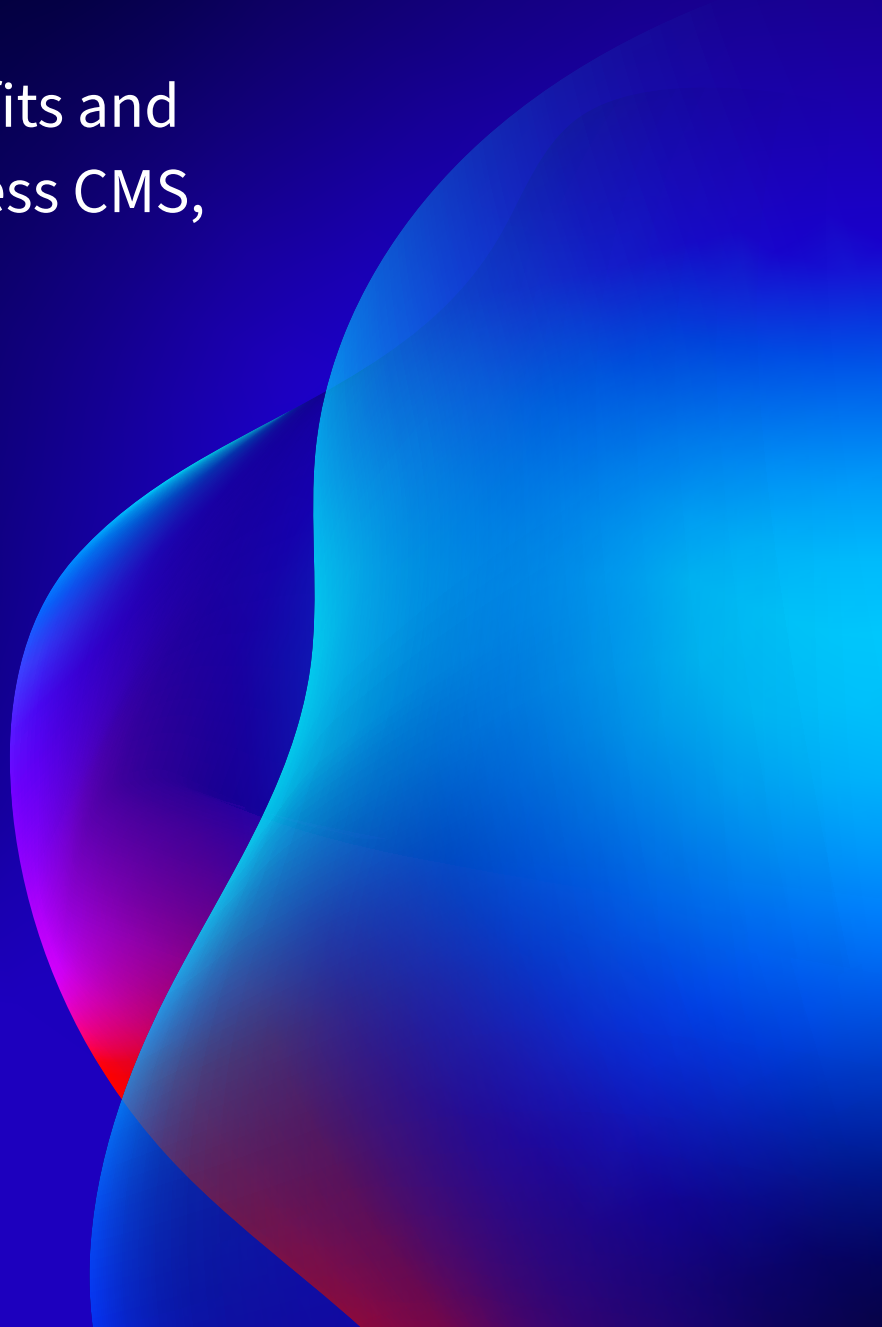
Liferay®

Choosing the Right Platform for Your Customer-Facing Experiences

Navigating the Benefits and Challenges of Headless CMS, LCAPs, and DXPs



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Introduction

As an IT leader, you have the unique challenge of balancing the demands of your line of business leaders for new applications with your mandate to manage organizational risk, tech stack complexity, and your team's skills.

When those LOB applications or experiences are for external audiences, new challenges arise. Creating digital applications for customers, suppliers, and go-to-market partners (dealers, distributors, retailers, etc.) often requires you to design for (and manage the risk of) collecting and handling data to drive personalization, offer self service, and enable digital transactions.

Platforms can be an attractive way to address these competing priorities. They provide a standard on which to build LOB solutions, so you can focus your risk, security, and governance efforts on a single technology. But you still have enough flexibility to tailor the platforms to fulfill the often very different business requirements each project brings.

In this guide, we walk through the advantages and cautions of the following platform categories:

- **Custom applications built on a headless CMS + JS Front-End**
- **Low code application platforms (LCAP)**
- **Digital experience platforms (DXP)**

The (Still) Growing Demand for Digital Transformation

Digital transformation is a no-brainer investment for most organizations because:

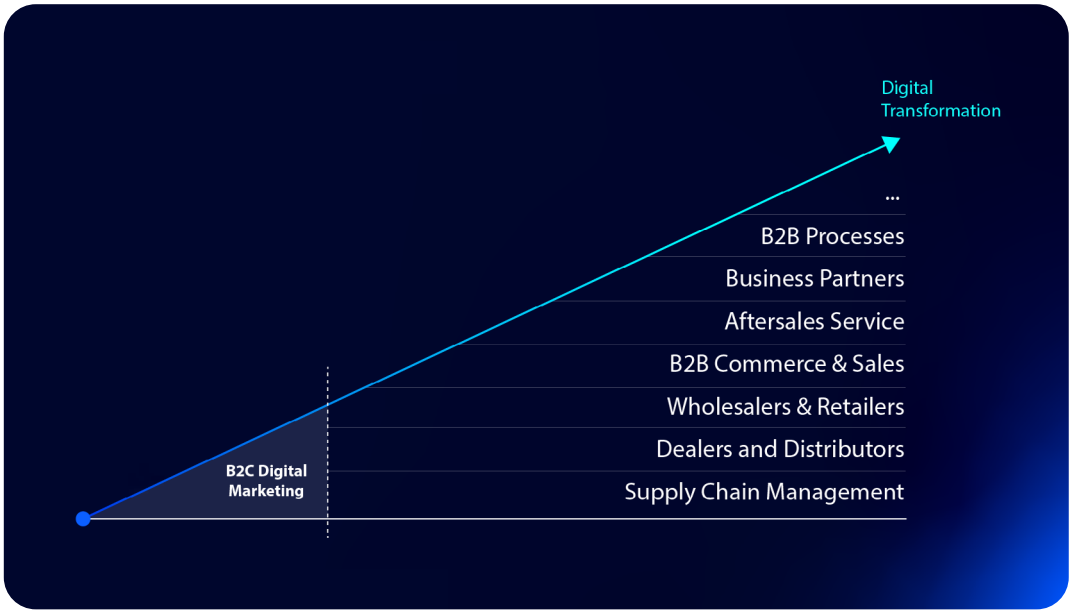
- Users expect digital channels to be available to them.
- Most users prefer to get things done on their own, on their own schedule.
- Digital channels are far more cost-effective than most alternatives.

And while we've been driving digital transformation initiatives for over a decade, there's still a lot left to do when you consider the full breadth and depth of processes and interactions that comprise running our organizations day to day.

- Customers and partners filling out and submitting applications.
- Customers and partners creating requests for help or services.
- Customers and partners making purchases, from B2C online shopping to restaurant suppliers to large federal government contractors.
- Customers and partners understanding and filing claims against warranties, insurance policies, or other business obligations.
- Teams taking new products and services to market.

- Businesses serving customers in multiple cultures, industries and market segments.
- Companies managing and ensuring the quality of suppliers and distributors.

Alarmingly, a lot of this business is still done through phone calls, emails, spreadsheets, or even fax machines. With so much work at hand, having a systematic, repeatable approach for creating digital applications to support the many facets of business is becoming more important than ever.



We've just scratched the surface of digital transformation of core business processes.

General Overview of Platforms

Headless CMS + Java Script Front-End

Using a headless CMS with a Javascript front-end is an approach to website and app development that separates content authoring and management from what's used to build the end user experience. Content from the headless CMS is delivered via API to one or more front-end experiences, which are built using React, Next, Vue, or other front-end frameworks built in Javascript.

This approach has been very popular, especially with developers that appreciate the freedom it affords. However, this has had some significant drawbacks for business users, who sometimes have to depend on developers to make even simple changes to content.

Headless CMS Advantages

- **Front-End Freedom:** Developers can use modern, specialized frameworks to build highly customized, fast, and interactive user experiences.
- **Omnichannel Delivery:** Decoupled content can be published seamlessly across various channels—websites, mobile apps, smart devices, and more—from a single source.
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Headless CMS Cautions

- **Increased Development Effort:** Building a custom front-end requires a skilled development team and more upfront work compared to an all-in-one platform.
- **No Live Preview:** Content creators often can't see how content will appear within specific channels without additional development.
- **Complexity:** Managing separate front-end and back-end systems can add complexity to a project, requiring strong coordination between teams.

Low Code Application Platforms (LCAPs)

Low Code Application Platforms (LCAPs) allow developers to build multiple applications for an organization using drag-and-drop visual interfaces and pre-built components. Some LCAPs support native mobile app development and some provide support for software development lifecycles.

LCAPs are favored by IT departments who want to be able to deliver multiple internal business applications for different LOB stakeholders on a single, standard platform.

LCAP Advantages

- **Rapid Development:** LCAPs significantly reduce development time, enabling businesses to create and deploy applications much faster than with traditional coding.
- **Cost-Effectiveness:** Reduced development time and the ability to use less-specialized talent can lower project costs.
- **Standardization:** Apps are developed using the same platform, enhancing reusability and building team skill sets.

LCAP Cautions

- **Content Management:** LCAPs often lack content management, personalization, and rich media capabilities needed for a truly compelling, consumer-grade experience.

- **Limited Customization:** While low-code platforms offer some flexibility, they can be restrictive. It can be challenging to implement highly specific, unique features that aren't supported by the platform's pre-built components.
- **Vendor Lock-In:** Relying heavily on a single platform can make it difficult and costly to migrate your application or data to another system in the future.

Digital Experience Platforms (DXPs)

Digital Experience Platforms (DXPs) provide a cohesive foundation for creating, managing, and optimizing digital customer experiences. They are designed to support the creation of experiences that are compliant with an organization's brand and design system. A DXP typically includes tools for content management, commerce, personalization, analytics, and customer data, which help tailor the experience to different users and audiences.

DXP Advantages

- **Unified Content, Users, and Data:** DXPs are designed to bring together and use these three key elements of customer-facing experiences.
- **Omnichannel + Native Experience:** Like headless CMSes, most modern DXPs support omni-channel experiences through headless. However, with native site creation capabilities, nontechnical users can view content in-context.
- **Streamlined Platform:** In the best case, a DXP can natively provide content management, site building, commerce, personalization, and analytics in one platform—and the parts have been designed to work well together.

DXP Cautions

- **Potential Overkill:** Sometimes you just don't need everything a DXP offers.
- **Incompatible Products ("Frankenstein DXP"):** Some DXP vendors have acquired their way to their suite, and constituent parts don't work together.
- **Lack of Low Code & Workflow:** Business-process intensive apps may not be supported by all DXPs, where the availability of low code and forms/workflow features varies.

Now let's look at some of the common requirements we see in the digital channels that are built to support business interactions with external audiences.

Digital Personalization: Powerful Potential

One of the biggest potential benefits of digital channels is the ability to personalize to each user or account at scale.

By default, digital channels are less personal than traditional channels. B2B customers, for example, are very comfortable picking up the phone to call a rep they've done business with for decades, to ensure they get the best pricing, most recent discounts, and the convenience of having someone enter an order on their behalf.

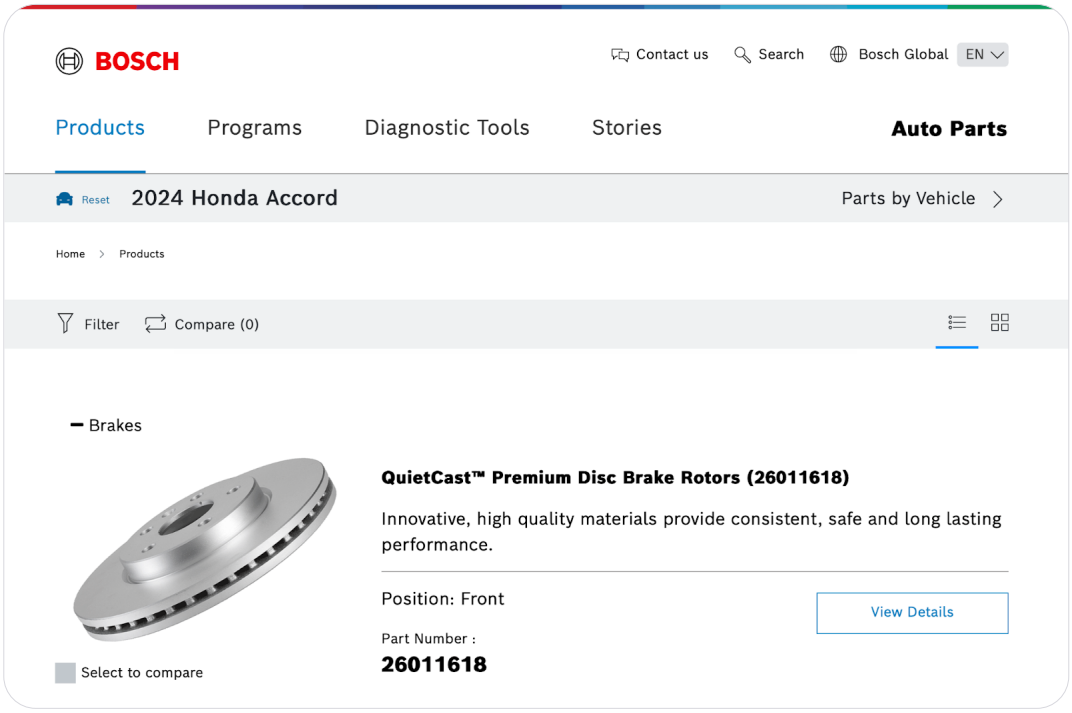
Yet, one of the most powerful, value-added aspects of digital channels, if done correctly, is personalization. For example, giving a customer up-to-the-minute information on how much inventory they have remaining in four different warehouses around the country, coupled with historical purchase data to then recommend to the buyer that they place an order of widgets just in time, is something that even the most well informed sales rep would be hard-pressed to do at scale.

Personalization Use Cases

There are endless ways to personalize a digital experience, but here are three less obvious examples that we see, especially beyond the typical B2C digital marketing use case.

Personalize to Purchase History

Whether you're selling a consumer product, B2B equipment, restaurant supplies, an insurance policy, or a digital service, there's a lot of power and convenience that comes with personalizing to your customer's purchase history. For example, someone who purchased an appliance can be shown the correct documentation, spec sheets, and maintenance schedule for that model, rather than having to sift through a documentation center to find them. Personalization can also eliminate mistakes when ordering consumables, accessories, or spare parts. This minimizes frustration for the customer and reduces unnecessary cost for the provider.



On Bosch Auto Parts's B2C website, enter vehicle information to only show compatible parts.

Personalize by Authorization or Role

Often overlooked in the personalization discussion is the need to only provide access to content or data that a user has the rights to see.

For example, in a health care context, this could be ensuring that primary care physicians and next of kin have full access to a patient's electronic medical records, but third-party labs or extended family members have a more limited view.

Government organizations that handle personal citizen data likely also have to be very deliberate about scoping access to that data.

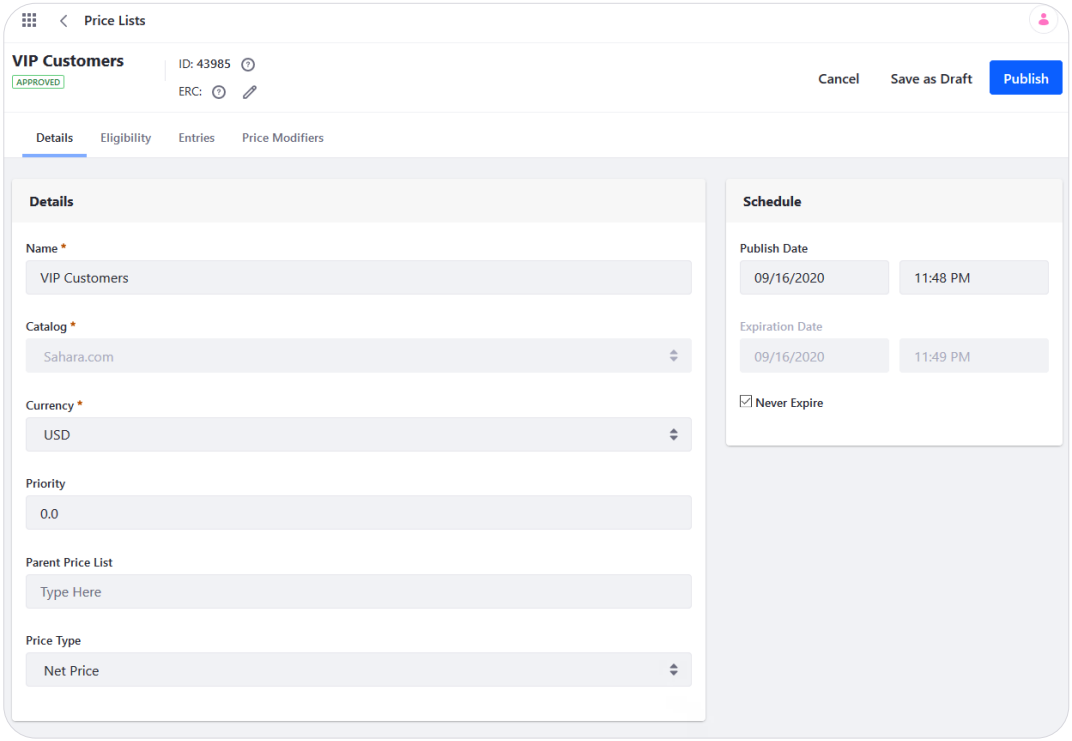
For consumer-facing experiences such as retail banking, you sometimes have the dynamic where only certain segments of the customer base, e.g. that fall within a net worth range or have excellent credit scores, are offered exclusive products and services.

B2B Personalization

Personalization can be even more nuanced in B2B. Consider the following aspects:

- In B2B, all members of an account or buyer group can represent the buyer, and the experience needs to be personalized both to the account and to individuals.
- Individual members of the B2B customer account might have additional personalization opportunities. The experience might be different for the procurement person, vs. the one choosing items to purchase, vs. the one who approves the order.

- Pricing might be specific to the account or a segment of accounts (such as different tiers based on credit rating, purchase history, or geography).



In B2B, long-time customers or those with more leverage can be granted more favorable prices.

Personalization Capabilities by Platform Type

Below is a high-level summary of some of how each platform type performs against these personalization use cases.

Capability/ Platform	**Anonymous Personalization** (e.g. Pre-Purchase)	**B2C Customer Personalization** (e.g. Purchase History)	**Authorization-based Personalization**	**B2B Account Personalization**
LCAP	**Less Suited** LCAPs don't typically tackle this use case.	**Suited** Typically by role or using business logic	**Well Suited** Accomplished through roles and RBAC.	**Somewhat Suited** Need to use custom group membership.
DXP	**Well Suited** DXP do this by design.	**Suited** Using user behavior, demographic data, and third-party data, e.g. CRM.	**Somewhat Suited** Varying support by vendor for known users.	**Somewhat Suited** Varying support by vendor for accounts.
Headless CMS + JS Front-End	Anything possible **but** requires custom development and integration.			

Digital Self-Service

The value to an organization of enabling self-service through digital channels is a well trodden path, with costs averaging a few cents to the dollar compared to phone-based or in-person interactions.

Customers also generally prefer self-service channels, which allow them to resolve issues or find information on their own, and when it's convenient for them.

Self-Service Examples in Select Industries

Government: Digital Citizen Services

Because citizens usually have uniquely identifying information, digital services can often be made available without requiring an account to be created, though it is often optional for the citizen's convenience.

- Pay a parking citation
- Apply for or renew a driver's license or vehicle registration
- Start or stop services (garbage collection, utilities)
- Make tax payments
- Apply for a business license

Financial Services: Self-Service Banking & Investing

These financial services examples span prospective and existing customers.

- Apply for a loan or credit card
- Open an account
- Execute trades
- Access investment prospectus
- Adjust risk profiles & retirement goals

Manufacturing Self-Service Use Cases

Not only is self-service more cost-effective compared to other channels, it helps customers invest in the proper usage and care of their products. This leads to a better overall customer experience, and helps the company avoid costly warranty repairs or product replacements.

- Resolve product issues
- Open a service ticket
- Make warranty claims
- Schedule service or maintenance
- Purchase consumables, spare parts, add-on products, or additional services

AI and Self-Service

With so many AI services now available, you can't plan for a self service experience without having a strategy for incorporating AI into that experience. Consider two major approaches:

- **Assisting the customer directly:** AI can help a customer find the answer to a question more quickly than using a search box (or calling a CSR). They can help diagnose an issue the customer is experiencing by analyzing data on behalf of the customer. They

can also suggest potential resolutions to deflect a customer from opening a customer support ticket by showing the customer how others have resolved a similar issue in the past.

In all these cases, what's important is to make it very clear to the customer that they are interfacing with AI—in other words, don't try to pass off the AI as a real human being.

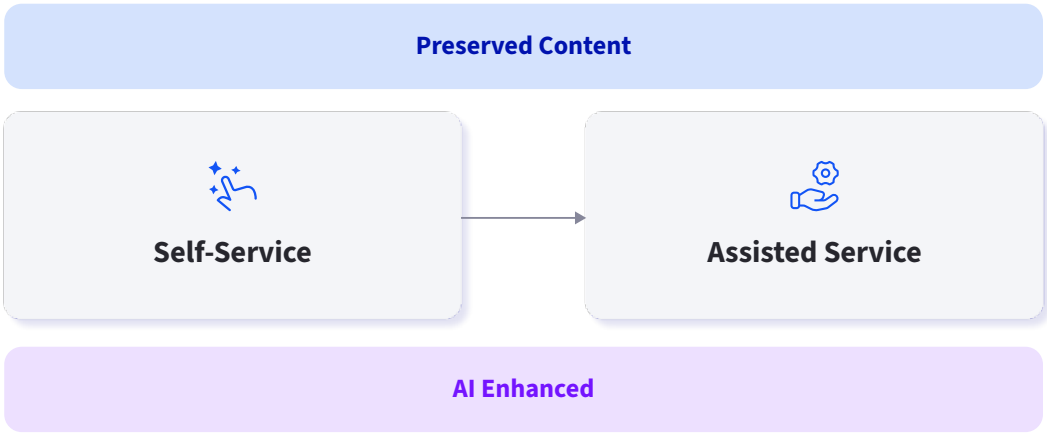
- **Assisting the CSR behind the scenes:** If you're concerned about the perception that you're handing customer service over to machines, or you're still training your AI models on your data, you can always have AI assist your CSR. With this approach, most of the same use cases (analyzing data, anticipating resolutions) apply, except you only show the AI responses to the CSR, who can then decide how much of that recommendation to incorporate in their (human) response to the end customer.

Continuity: From Self-Service to Assisted Service

Everyone prefers starting with self-service, but as soon as they experience some frustration or are unable to get results on their own, they want to be able to quickly and seamlessly reach a live human.

Ideally, the human who takes over engages with the context of the customer at hand. Nothing is more frustrating as a customer than to have spent 45 minutes on a self-service channel unsuccessfully, only to have the CSR begin the conversation with, "So, how can I help you today?"

Organizations must craft and align their digital experience, backend systems, business processes, and personnel training to make this kind of continuous, context-aware service experience possible.



A well designed service experience transitions smoothly from self-service to assisted service without losing the customer's context. AI can assist in both modalities.

Self-Service Capabilities by Platform Type

Capability/ Platform	Knowledge Base & Customer Community	Transactional Self-Service	Self-Service Purchases
LCAP	**Less Suited** Lack of content management means you have to model it or integrate a third-party CMS.	**Well Suited** LCAPs support back-end system integration. Vendor strengths will vary, but are generally strong in terms of forms and workflows	**Suited** Integration and app creation can fill this use case. But lack of branding / user experience can hinder effectiveness except for simple purchases.
DXP	**Well Suited** Users, content, and site creation are core to DXPs.	**Well Suited** DXPs support back-end system integration. Vendor strengths will vary, but are generally strong on user experience.	**Well Suited** Support for integration and branded experience creation. Some DXP vendors include commerce capabilities (PIM, payment, orders, returns).
Headless CMS + JS Front-End	**Suited** Structured content types can be created to serve as articles. Front end experience must be created.	**Less Suited** You have to integrate and build forms and workflow from scratch.	**It Depends** You have to integrate a separate commerce engine and build the front end from scratch. But for super customized, high traffic commerce, Headless can be powerful.

Brand Consistency

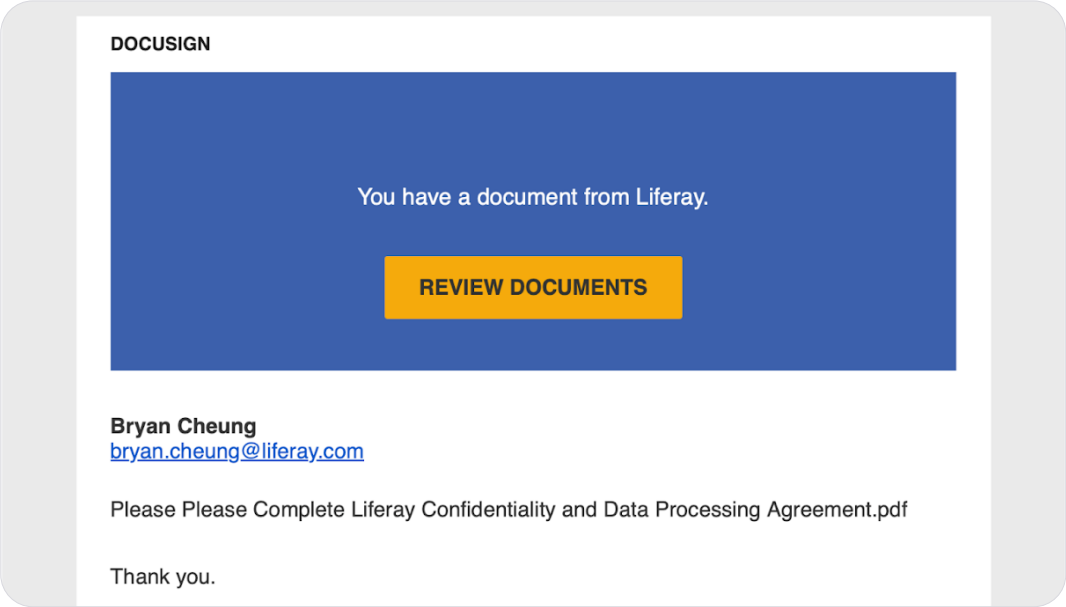
At first, supporting brand consistency may not seem like a top consideration when evaluating platform technologies. We usually think of branding as something for marketing to take care of. However, when you consider the full scope of what your business stakeholders are trying to achieve with their external facing applications, the need for brand fidelity becomes obvious.

Users need to opt-in to data collection for a personalized experience to make the biggest impact possible. And driving self-service inevitably means getting users to be comfortable executing personal, high-value transactions online:

- Accessing bloodwork results online (health care) means accessing highly personal health records data.
- Updating dependents and beneficiaries (wealth management) means potentially exposing social security / government ID numbers through digital channels.
- Executing trades online requires users to believe the digital channel will get them the best possible pricing.

You can't do any of these without a high degree of trust, and a customer's trust is imputed to a company's brand and brand assets. No matter how simple the transaction, if the customer has reason to suspect that this digital channel doesn't represent the company, they will be reluctant to transact or provide personal information through it.

Consider the reverse case: bad actors, such as phishing attack perpetrators, rely heavily on branding to lull their target victims into a false sense of security, borrowing logos and mimicking colors, spacing, and typography as part of their ruse.



Power of brand: Phishing perpetrators rely on DocuSign's very familiar email format to try to fool its victims.

While all three platform types can ultimately be customized to meet your company's brand guidelines and design systems, they are not equally capable:

- **Headless CMS + JS Front-Ends are infinitely customizable** through the work of developers, who can tailor the UI layer to adhere to your company's brand. However, this does require additional development work, which can be a smaller or larger effort depending on the project, technology used, and developer skill levels.
- **LCAPS are not obviously suited** for strong brand consistency, as most don't have strong experience layer design capabilities. Though LCAPs do provide drag-and-drop interfaces for assembling the experience layer, they tend to lack the level of precise UI control that marketing teams and designers need for absolute adherence to brand guidelines.
- **DXPs are not surprisingly designed for branding consistency** by their nature, striking a balance between the developer-dependent approach of JS Front-Ends and the limited tuneability of LCAPs. DXPs allows nontechnical business users to assemble pages and content, and to upload CSS files containing a company's design system, which then define the look and feel of the presentation layer. When needed, developers can tweak HTML and CSS code to fine-tune the UI.

In short—don't shortchange the ease of brand implementation in your vendor selection process, because it can be key to a successful solution for your line of business leaders.

Data Collection and Compliance

Assuming you've taken care of the brand question, next you'll want to be sure that, as you collect data from external audiences, you do so in compliance with data protection regulations. Now, there's a dizzying array of legislation in the area of data protection:

- **GDPR**, the European Union's General Data Protection Regulation, is the regulation that organizations need to be most concerned with if they do business in the EU. GDPR is very protective of individuals (requiring companies to obtain double opt-in consent, for example) and includes hefty fines for companies that violate its rules.
- With Brexit, it became necessary for the UK to create their own version of GDPR **(GDPR UK)**, which largely mirrors the original, except replacing EU bodies with UK-specific ones. There is also a notable difference in age of consent: 16 in the EU vs. 13 in the UK.
- Brazil's **LGPD** (Lei Geral de Proteção de Dados Pessoais) is quite aligned with GDPR, save some minor differences with respect to DPO (Data Protection Officer) election, notification periods, and fines.
- The US has not had broad legislation enacting regulations to the same extent as GDPR, but two narrower laws of note include:
  - **HIPAA** (Health Information Portability and Accountability Act), which protects patient health information and governs how it's handled.

- In California, the 2020 **CCPA** (California Consumer Privacy Act), expanded in 2023 by the California Privacy Rights Act **(CPRA)**, is somewhat similar to GDPR, with key differences, including much smaller fines, and being opt-out by nature (GDPR is opt-in).

If you're tempted to delegate the work of compliance to your software vendor, keep the following in mind:

- In general, SaaS vendors can provide compliance with data protection regulation (and absolutely should). Because SaaS vendors not only provide the core software for their solution but also run cloud infrastructure, manage storage, process data, and secure the application, they have full control over how data is collected, stored, processed, used, and deleted—and can therefore do so in compliance with data protection regulations.
- Platform vendors generally can't provide compliance because they don't have full control over all of the elements that are required to do so. Platforms are typically deployed to a company's private or public cloud infrastructure, so data collection and storage is the company's responsibility.
  - That said: some platform vendors have a SaaS offering and in these cases you should expect compliance with data protection regulations.

What should you expect from vendors if you are responsible for your own data protection compliance? Some platforms give you tools and frameworks to make your solution compliant. For example, Liferay provides tools that make it easy for you to export or erase a user's personal data. Appian takes a very similar approach and has some nice tooling around this as well.

But ultimately, while vendors can provide tools, they ultimately can't control how your company (and its business partners) handle and process that data. You as IT leaders have to work with your business stakeholders to ensure that processes, policies, and systems all work together to make your customer-facing experience compliant with data protection regulations.

IT leaders and business stakeholders can work together to make applications compliant with data protection regulations.

Data Collection: Operations & Infrastructure

When it comes to the actual practice of collecting and using data, your first option will be to leverage any existing data platforms you already have. If you already have a general data lake or a customer data platform (CDP), chances are you've also designed it to serve data and user segments to other systems like an LCAP or DXP.

In terms of leveraging data, each platform type tends to take different approaches. While you should evaluate each specific vendor offering's capabilities, you can use the following as a starting point for understanding how they might differ:

- **DXPs by nature are designed to leverage customer data** to drive things like personalization at the experience layer. Formally speaking, CDP capabilities can be considered just outside the scope of what a DXP delivers, but some vendors have developed varying levels of CDP or light CDP products. For example:
  - **Adobe** has a dedicated product called **Real-Time CDP**, which formally competes in the CDP market.
  - **Optimizely** has their **Optimizely Data Platform**, which can be considered a light CDP.
  - **Liferay** has **Analytics Cloud**, which can collect data from sites and apps using Javascript, as well as aggregate third-party data from external sources, such as a dedicated CDP or CRM, to drive segment definition and personalization.
- **LCAPs are designed to deal with multiple data sources** and have strong integration and object modeling capabilities. However, **LCAPs don't generally have capabilities to process customer data specifically**, such as segment definition or profile consolidation. However, LCAPs are designed to accelerate app development, so capable development teams should be able to create some basic segmentation and personalization capabilities on their own.
- **Headless CMSes with Javascript Front-Ends** by definition **rely wholly on third-party components to collect data, define segments, and take actions like personalization.** Because the CMS serves content via API, a personalization service would be needed to instruct the CMS which content to show to a user, and any user data or segment membership information would also need to come from a third party CDP or data service.

This provides the most flexibility for building highly customized applications, but does add complexity, development time, and maintenance effort.

Cloud & Infrastructure Considerations

One final important consideration in choosing a platform for your externally facing application will be whether you can properly design the infrastructure your application needs. In particular, if you're planning to collect data to drive personalization, you'll need to consider requirements such as data residency (especially in the public sector.

- **Headless CMS + JS Front-End:** Here again, when it comes to headless CMSes you can "do anything you want, but you'll have to work for it." This architectural pattern gives you full flexibility, which also means needing to design the overall system without a readymade solution from the vendor.
- **For LCAPs and DXPs**, there isn't any particular tendency at the category level, so you have to look at each specific vendor to see what your options are.

This table shows a few prominent vendors across all three categories and their deployment options. Of course, offerings change, and there are far more vendors out there, so you should confirm these details during your vendor selection.

Vendor/ Deployment Model	On Prem/ Your Cloud	Hosted Private SaaS	Multi Tenant SaaS	PaaS	Hybrid
Appian	✓	✓	✓	-	✓
Contentful	-	-	✓	-	-
Contentstack	-	✓	✓	-	-
Liferay	✓	✓	✓	✓	-
Optimizely	-	✓	✓	-	✓
OutSystems	✓	✓	✓	✓	-

Closing Thoughts

We've laid out some important considerations for choosing a platform for externally facing applications:

- **Personalization** and **self-service** are often strong requirements for these applications.
- **Brand consistency builds trust**, which is needed to achieve the app's business goals.
- **Data collection is needed for personalization**, which means you must evaluate vendor support for complying with privacy regulations.
- **Approaches to using customer data differ** meaningfully by platform type.
- **Deployment options matter** especially when using data-driven personalization.

Even taking these points into account, you may still find yourself needing to further narrow your choices. So it might be helpful to also consider these three last principles:

- **These are different tools designed for different jobs.** Each of these approaches were built with a universe of use cases in mind. Going outside of those use cases can be putting a square peg in a round hole. Sometimes people built websites with Sharepoint, but it was painful. A similar principle applies for headless CMSes, LCAPs, and DXPs.
- **Team comfort & productivity matter**, so the "best" tool might simply be whichever one helps your team deliver most efficiently. Take familiarity and skill set into account along with requirements and capabilities.
- **Product categories are starting points, but individual vendors differ significantly within each category**, with very different approaches and philosophies. For example, Payload and Sanity are developer-centric, code-first CMSes, whereas others have better support for business users. Appian is a business process-oriented LCAP. Liferay has DXP and LCAP characteristics. At the end of the day, you'll have to evaluate each vendor for its own merits beyond the boxes of CMS, LCAP, and DXP.

Moving Forward

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