Hype Cycle for Digital Commerce, 2020

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By Analysts Sandy Shen

Initiatives: Digital Commerce Technologies and 2 more

Pursuing digital commerce is a key way to gain customers, develop relationships, boost revenue and reduce costs. This Hype Cycle will help you evaluate the suitability of a wide range of technologies for your organization, in light of how long they will take to mature and their business value.

Analysis

What You Need to Know

This Hype Cycle helps organizations that are new to digital commerce or with existing digital commerce operations to understand the technology landscape and latest trends in the space so they can prioritize the technology investment.

Digital commerce became a key focus for many organizations during the COVID-19 pandemic, when offline businesses were shut down and organizations were forced to move to digital channels, either launching new endeavors or accelerating existing digital commerce projects. This has led to renewed interest in mature technologies, such as visual configuration and dynamic pricing, wider adoption of newer technologies, such as progressive web apps (PWAs) and enterprise marketplaces, and the rise of new offerings, such as live commerce. Digital commerce is a dynamic market, with new technologies appearing frequently and others maturing and reaching the mainstream market. This Hype Cycle provides a useful tool to understand the changing landscape.

The Hype Cycle

Gartner's 2019 Digital Commerce State of the Union Survey showed that respondents considered the most critical challenges to their digital commerce endeavors to be "quickly adding new features" and "delivering desired customer experience across all channels." As a result, most respondents had deployed or budgeted for real-time analytics and personalization (73%), PWA/single-page application (68%) and microservices/modular commerce architecture (67%). These investment trends are likely to continue throughout 2020, as they provide tangible business value and represent the future of digital commerce technologies. At the same time, some lesser deployed/budgeted technologies, such as AR/VR, subscription and thing commerce, may see increased interest post-pandemic due to their ability to support remote selling and automated purchases. These are important capabilities to increase business resilience.

We see three trends driving the movement of technologies on this year's Hype Cycle:
Visual experience driving engagement and conversion — COVID-19 has forced many businesses to start selling online, and visual experience has proven to be an effective tool in customer conversion. Technologies such as visual configuration, configure, price and quote (CPQ), and immersive commerce are mature and/or have been around for a long time but with relatively low adoption rates before COVID-19, but are now seeing higher interest. New technologies have also emerged, such as live commerce, which uses live video streaming to sell products, encourage buying through new types of engagement and deliver personalized support. Visual search also improves customer experience (CX) by quickly finding similar products. Live commerce and visual search are new additions this year.

New business models and service offerings driving new revenue — Enterprise marketplaces have seen accelerated adoption, as many organizations wanted to connect with their ecosystem partners and generate new revenue from commissions, subscription and value-added services in relation to operating the marketplace. In conjunction, multitenant operators, such as shopping malls and schools, as well as software vendors, are offering payment as a packaged service (PaaS) in addition to their core offerings. This enables them to generate revenue from payment services and bring end-to-end solutions to partners and clients. PaaS is a new addition this year.

Customer analytics and privacy protection driving better CX — Customer insight is key in delivering compelling and personalized CX that leads to long-term business benefits. Organizations need tools such as customer data platform (CDP), master data management (MDM) of customer data, customer journey analytics, personalization engines and voice of the customer (VoC) for better insight. At the same time, they need to protect customer privacy and ensure security by using privacy by design, consent and preference management, customer identity and access management (IAM) and Internet of Things (IoT) authentication, all of which are new additions this year.

As the pace of change increases and technology gets more complex in digital commerce, organizations are investing in modular architecture to gain agility and flexibility. This sees API-based commerce at its peak, and composable commerce has made its first appearance on the Hype Cycle at the trigger stage. These architectures will change the technology landscape in terms of vendor solutions and adoption patterns in the next five to 10 years.

Distributed order management (DOM) has been repositioned to focus on the retail sector, as the vertical demands more complex use cases amid COVID-19 such as curbside pickup, store delivery and partner fulfillment. Thus, its position has been moved from the Slope of Enlightenment to the Peak.

Price optimization and management for B2B has low penetration despite its high maturity level, due to its historically-high implementation costs. However, recent cost-lowering initiatives, such as fixed-price or zero-price implementation packages, will make this solution accessible to a wider audience.

Figure 1. Hype Cycle for Digital Commerce, 2020
The Priority Matrix

Organizations need to pay attention to the following technologies due to their business impacts within the next five years:

**Visual configuration** — Organizations selling configurable products should see whether this technology can add value to their selling process, either for their sales team or for customers. The technology is quite mature and at the plateau, and likely to move off the Hype Cycle next year.

**API-based digital commerce and composable commerce** — Organizations looking for a modern architecture should consider adopting API-based digital commerce, which improves the speed to launch new front-end experiences and is a precursor to composable commerce, the future of commerce applications. Many commerce vendors now offer “headless” solutions, and with front end as a service (FEaaS) offerings, organizations can more easily implement this architecture.

**Customer data and analytics** — Organizations keen to deliver compelling customer experience should look into customer data and analytics technologies that will reach plateau in the next two to five years with moderate to high business impacts. These include customer journey analytics, VoC, customer service analytics, CDP and MDM of customer data.
Some technologies with transformational benefits will reach plateau in more than five years, such as conversational AI platforms for commerce, emotional AI, thing commerce and smart check-out. Organizations can showcase the capabilities of new these technologies and make long-term plans if they fit with the organizations’ strategic ambitions.

**Figure 2. Priority Matrix for Digital Commerce, 2020**

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Years to Mainstream Adoption</th>
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<tr>
<td>Transformational</td>
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<td>API-Based Digital Commerce</td>
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Off the Hype Cycle

- Knowledge management for customer service, web real-time communications, video calling for customer service, social feedback management and analytics for customer intelligence have
FEaaS

Analysis By: Mike Lowndes

**Definition:** Front end as a service (FEaaS) is the provision of presentation layers, orchestration and operations for browser-based digital experiences as a service. Vendors are cloud-based and rely on client’s APIs to power digital experiences.

**Position and Adoption Speed Justification:** Front end as a service has emerged within the last two years. The vendors involved, unless startups, usually have a heritage in the “mobile web” space, layering a solution over traditional desktop websites using APIs and often less real-time solutions such as screen scraping/RPA. The aim was to provide simpler, much lower bandwidth websites before and during the early smartphone era (also known as m-dot sites). The mobile web has all but disappeared. It was first replaced by responsive and adaptive design for websites, and now by single-page applications (SPA), progressive web apps (PWA) and accelerated mobile pages (AMPs). FEaaS providers abstract the provision and operation of these presentation technologies to a managed cloud service.

FEaaS is most useful where complex and interactive customer journeys are required, such as digital commerce. A challenge with FEaaS can be that some aspects of presentation management that have been traditionally in the hands of the business user can return to being developer tasks, unless careful technology choices are made. Vendors of “headless” content-centric applications are addressing this need.

**User Advice:** The resource requirement to maintain a skilled in-house team to meet modern presentation layer demands is high, and skills are rare. Look to utilize FEaaS if you need to shift to a decoupled front end, such as an SPA or PWA, for desktop and mobile experiences but do not want the overhead of managing a front-end team or the associated DevOps and cloud-hosting capabilities. FEaaS providers, by providing a central shared development and maintenance resource, templates and process boilerplates, are able to scale front-end operations. They also provide the cloud-hosting solutions and associated edge acceleration, usually via partnership with a content delivery network (CDN) provider.

**Business Impact:** The resource requirement to maintain a skilled in-house team to meet modern presentation layer demands is high, and skills are rare. Look to utilize FEaaS if you need to shift to a decoupled front end, such as an SPA or PWA, for desktop and mobile experiences but do not want the overhead of managing a front-end team or the associated DevOps and cloud-hosting capabilities.
capabilities. FEaaS providers, by providing a central shared development and maintenance resource, templates and process boilerplates, are able to scale front-end operations. They also provide the cloud-hosting solutions and associated edge acceleration, usually via partnership with a content delivery network (CDN) provider. Front-end design patterns (SPA, PWA and AMPs) can significantly speed up the delivery of webpages on limited bandwidths. They can also improve the experience and therefore engagement of customers regardless of viewport size (for instance, mobile device vs. laptop). PWAs also provide a much more “applike” experience, especially to mobile device browsers, taking advantage of device-side storage and native device features (biometrics, gesture navigation, camera access, push notifications). They eliminate the need to invest in native mobile apps or publish via a device vendor’s app store.

Businesses should consider FEaaS if they desire to use such technologies but do not have the resources to develop, deliver and manage it. The impact is less transformational for purely content-focused websites, but more so for fronting “web apps” digital commerce, customer portals, booking engines, communications and social platforms, forums, etc., taking advantage of the mobile-first approach and integration with native device capabilities.

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Frontastic; Mobify; Moovweb

Recommended Reading: “Apply the Principles Behind the Future of Applications to Digital Commerce”

“How Progressive Web Apps Improve Digital Commerce Experience”

Thing Commerce

Analysis By: Sandy Shen

Definition: Thing commerce is a service where IoT devices make purchases on behalf of humans by directly taking requests from the customer or inferring demand based on rules, context and customer intelligence. Things are becoming customers in making requests and purchases, reporting disputes and negotiating better deals.

Position and Adoption Speed Justification: Thing commerce is early stage as many organizations focus on delivering and expanding commerce through the traditional channels such as websites and mobile apps. The service's value proposition to customers is convenience by automating purchases and assisting buying decisions with personalized product recommendations. This is
achieved by understanding customer behavior and preferences, and predicting customer needs. Typical use cases include autoreplenishment, predictive maintenance and compliance such as medication and equipment tracking. Digital giants and leading manufacturers have deployed thing commerce supporting the above use cases. In some closed environments such as malls, theme parks or cruise ships, things become customers where a device becomes an identity that can grant access and log activities and transactions as customers move around. Thing commerce adoption is still low as organizations struggle to identify the right products and use cases that offer good value for customers. Survey data shows that 49% of CIOs believe demand from machine customers will become significant in their industry by 2030. So it will take at least five years before thing commerce becomes a major contributor to digital sales for many organizations. Challenges include that current technologies including machine learning cannot yet predict customer needs with high confidence, and that customers haven’t trusted the machine enough to delegate purchase decisions. COVID-19 can be a silver lining as more organizations are launching digital commerce via multiple digital channels.

User Advice:

- Identify products and services that are suited for thing commerce. Start with autoreplenishment or predictive maintenance, which are established use cases. Use rule-based mechanism to trigger the purchase as most customers don’t have enough trust in machines making sophisticated purchase decisions, and the technologies are not fully capable of doing so yet. Design a good customer experience by developing reasonable price plans and reliable operational support such as accurate order fulfillment, timely delivery or on-site services.

- Autoreplenishment services should include a reasonable range of product selections beyond manufacturer’s own products. While this seems to weaken the lock-in effect in the short term, it gives customers more choices and nurtures trust and loyalty in the long term.

- Map customers’ purchase process using customer journey and see in which steps customers experience challenges and friction points and where things can add value, if not a full-blown commerce transaction. For example, things can detect malfunctions and trigger service requests, offer installation manuals or guide customers through diagnosis process to pinpoint failing parts.

- Early adopter organizations should investigate the possibility of developing their own thing commerce platform in order to own the customer relationship and customer data. They will need to invest in IoT technologies, advanced analytics and probably conversational interface if customers need to interact with the machine.

- Mainstream organizations should consider joining major thing commerce platforms through which to sell their products. Try to negotiate with the platform operator for sharing of customer data so you have more visibility into customer behavior.
Business Impact: Thing commerce helps reduce customer efforts and friction during the purchase process and improve customer experience that will lead to higher satisfaction and loyalty. When done right, organizations will be able to build a trusted customer relationship through reliable services and product delivery. This would see customers trust the machine and the organization to delegate more buying decisions and increase their spending.

Benefit Rating: Transformational

Market Penetration: Less than 1% of target audience

Maturity: Emerging

Sample Vendors: Amazon; Fastenal; GE Digital; HP Inc.; IBM; LG; Samsung Electronics; Siemens; Ubox

Recommended Reading: “IoT-Based Thing Commerce Requires a Differentiated Customer Experience”

“Prepare Your Business to Engage, Interact, Serve and Listen to ’Things’ as a New Customer Segment”

“Machine Customers: The Next Massive Emerging Market”

“How Customer Experience Changes When Your Customer Is a Thing”

Composable Commerce

Analysis By: Jason Daigler; Mike Lowndes; Sandy Shen

Definition: Composable commerce is an architectural approach to digital commerce where customer experiences are constructed with packaged business capabilities (PBCs). It is a modular approach that requires loosely coupled application capabilities to improve flexibility in composing new commerce functionality and experiences to be more responsive to changing business needs. This approach contrasts with a platform-centric approach in which monolithic commerce platforms are deployed to manage most aspects of the customer experience.

Position and Adoption Speed Justification: Many of the individual components that comprise full digital commerce solutions, such as personalization engines, commerce search, and content management, have been around for several years and sold independently. So the concept of using best-of-breed, individual applications to construct commerce experiences is not new. However, monolithic digital commerce platforms have long sat at the center of the commerce experience, powering many aspects of the commerce customer journey. As more modular, API-based commerce platforms and front-end capabilities are now available, companies can further decompose their commerce tech stack into modular components that will evolve into PBCs (see “Innovation Insight for Packaged Business Capabilities and Their Role in the Future Composable Enterprise”). Especially in a post-COVID-19 environment, the need for greater flexibility and agility
will bring increased attention to composable commerce approaches. However, stitching together these components is not easy, especially when they come from different vendors as prebuilt integrations do not typically exist. Today the market remains platform-centric, with some commerce platform vendors offering an “app marketplace” of plug-ins for ecosystem components, while the platforms remain the primary source from which functionality is extended. As such, full-scale composable commerce is still in the early stages of evolution and adoption, and better integration between components is required. Ultimately, business user-friendly integration tools such as low-code application platforms (LCAPs) that allow business admin UIs to manage the various components, need to emerge before the approach becomes more mainstream.

Composable commerce is an evolution of API-based digital commerce, which typically focuses more on separating the presentation layer and the back-end commerce functionality, allowing the commerce platform to run in a “headless” fashion. Composable commerce focuses on modular components for the entire commerce stack — both front-end and back-end functionality. Additionally, API-based commerce can be executed with an API layer on top of a monolithic commerce platform, whereas a platform supporting composable commerce would have a much more modular architecture.

**User Advice:** Application leaders responsible for digital commerce technologies should:

- Evaluate their existing commerce tech stack and identify weaknesses, especially those that prevent them from moving quickly to meet ever-changing customer demands. If the flexibility and modularity provided by composable commerce is deemed to be a valuable benefit, they should create a roadmap to replace the existing commerce platform over time. This can be done by decoupling individual components from the monolith and replacing them as PBCs that are either purchased from a vendor or built internally. This often begins at the presentation layer, which is decoupled so the commerce platform is “headless” and a more composable approach is enabled.

- Acknowledge the complexity that integration will play in composable commerce. Many individual components, today, are not well-integrated. Low code or no code integration generally does not exist between commerce PBCs today, so resources to build and maintain the integrations over time will be required and should be factored into project plans.

- Consider the components they will need to develop in order to optimize experiences in multiple channels, as today’s customer will frequently bounce from channel to channel during a purchase decision.

**Business Impact:** Composable commerce will provide significant benefits to digital commerce teams in midsize, large and enterprise companies that want a more flexible architecture that allows them to move quickly to respond to customer demand. The approach will also enable agility inside commerce organizations by allowing teams to work on and deploy individual components of the commerce tech stack without impacting other components. These commerce teams will also be
less beholden to single vendors and will avoid the problems arising from large version upgrades for monolithic commerce platforms. They will also have more ability to swap out capabilities when new vendors emerge, expand to new channels more easily, and develop more innovative solutions. But they will need to have strong integration and API orchestration skills to be successful.

**Benefit Rating:** Transformational

**Market Penetration:** 1% to 5% of target audience

**Maturity:** Emerging

**Sample Vendors:** Algolia; Amplience; commercetools; Contentstack; Elastic Path; Kibo; Mobify; Moovweb; VTEX; Vue Storefront

Recommended Reading: “Composable Commerce Must Be Adopted for the Future of Applications”

“Apply the Principles Behind the Future of Applications to Digital Commerce”

“Innovation Insight for Packaged Business Capabilities and Their Role in the Future Composable Enterprise”

“2020 Strategic Roadmap for the Future of Applications”

**Emotion AI**

**Analysis By:** Annette Zimmermann

**Definition:** Emotion artificial intelligence (AI) technologies (also called affective computing) use AI to analyze the emotional state of a user (via computer vision, audio/voice input, sensors and/or software logic). It can initiate responses by performing specific, personalized actions to fit the mood of the customer.

**Position and Adoption Speed Justification:** One of the benefits of detecting emotions/states is for a system to act more sympathetically. It creates anthropomorphic qualities for personal assistant robots (PARs), making them appear more "human." This "emotional capability" is an important element in enhancing the communication and interaction between users and a PAR. People's daily behavior, communication and decisions are based on emotions — our nonverbal responses in a one-on-one communication are an inseparable element from our dialogues and need to be considered in the human-machine interface (HMI) concept.

The first step in detecting human emotions is to define the different types of emotions, from angry, sad, happy and insecure. AI is a critical part of some, although not all, emotion AI solutions. Computer vision (CV)-based emotion AI requires a collection of imaging/video data and preparing it to be fed into an artificial neural network (ANN). Vendors using CV technology to detect emotions primarily apply convolutional neural networks (CNNs), a deep-learning technique.
Several new commercial deployments occurred in 2019 for emotion AI and new vendors entered the market. At the same time, we did not see any evidence for great advancements in technological capabilities. Therefore, the position of this profile on the Hype Cycle was stagnant.

There are several vendors, including Beyond Verbal, audEERING and Intelligent Voice, that have developed emotion AI systems based on audio analysis. Phonetic attributes and the understanding of words do not play a primary role here, and the most sophisticated systems are completely language-agnostic, including tonal languages. Vendors have developed algorithms that attribute the different pieces of sound waves to emotional states. The main type of neural networks (NNs) used for audio-based emotion AI are recurrent neural networks (RNNs).

Data quality (lab-based versus real-life data) and machine learning (ML) techniques determine the reliability of the technology to detect emotions. The better the data and the more data there is, the higher the probability of detecting different nuances of human emotions. Combinations of CV-based, audio-based and sensor-supported technologies make sense in certain use cases, but is not always required to gain a better result.

**User Advice:** As the market is currently very immature, most vendors are focused on two or three use cases in two or three industries. Hence, when selecting a vendor, it is important to review their capabilities and reference cases. As discussed above, the context and environment of the use case will determine the type of emotion AI to be used. Organizations should make lists of use cases that apply to them.

- Be use-case-driven. The use case will determine the emotion AI technology to be used and vendor selection.
- Appoint responsibility for data privacy in your organization, a chief data privacy officer or equivalent.
- Work with your vendor on change management in order to avoid user backlash due to sensitive data being collected.

At the same time, identifying and processing human emotion is currently a gray area, especially in the EU. The EU Commission has started an initiative to review the ethical aspects of AI technologies, and emotion AI will certainly be part of this debate.

**Business Impact:** Emotion AI technologies have already been adopted by various business functions in different industries, including call centers, PARs and high-end cars. CV-based emotion AI has already been used for more than a decade in market research — testing how consumers react to products and commercials. For about two years, many vendors have moved into completely new industries and use cases such as automotive, robotics, medical diagnostics, education and the public sector.

- Insurance companies are using audio-based emotion AI for fraud detection.
■ In call centers, voice-based emotion AI can be used for intelligent routing for a better customer experience.

■ Software exists that helps physicians with diagnosing depression and dementia.

■ Dubai’s Road and Transport Authority (RTA) announced the use of CV-based emotion recognition in four of its “customer happiness centers.” When the “happiness level” among visitors drops below a certain threshold (maybe due to long queues) employees are notified and can act upon it.

■ Inside the car, audio and CV-based emotion AI helps to understand what is going on and detects whether passengers are emotionally distracted.

■ In retail, stores are adopting camera-based facial and emotional recognition to understand demographics and moods of visitors, enhancing the retail experience. Similar trends are emerging in the hospitality industry (in hotel lobbies) where cameras are used to recognize frequent guests and recognize their emotions.

■ In education, we have seen prototypes of learning software that adapts to the user’s emotional state. Another opportunity is in training and workshops, where emotions of the training participants are captured to see how they are experiencing the training.

**Benefit Rating:** Transformational

**Market Penetration:** Less than 1% of target audience

**Maturity:** Emerging

**Sample Vendors:** audEERING; Affectiva; Behavioral Signals; Eyeris; Google; Intelligent Voice; Microsoft; Voicesense

**Recommended Reading:** “Competitive Landscape: Emotion AI Technologies, Worldwide”

“Competitive Landscape: Customer Analytics”

**Internet of Things Authentication**

**Analysis By:** David Mahdi; Michael Kelley

**Definition:** Internet of Things (IoT) authentication is the mechanism of establishing trust in the identity of a thing (device, etc.) interacting with other entities, such as devices, applications, cloud services or gateways operating in an IoT environment. Authentication for the “things” in IoT takes into account potential resource constraints of IoT devices, the bandwidth limitations of networks they operate within and the mechanized nature of interaction among various IoT entities.
Position and Adoption Speed Justification: The diversity of devices and their different capabilities result in a market that is in a state of flux. In the IoT authentication space there is a lot of innovation, in areas such as new provisioning flows, and new software and hardware platform support for full life cycle handling of credentials. Unfortunately, many IoT devices lack physical integrity protection due to device manufacturers’ poor track record on security (see “IoT Security Primer: Challenges and Emerging Practices”). In addition, IoT devices can be resource-constrained with low computing power and storage capacity. Some authentication methods are not good candidates due to their significant bandwidth and computational requirements. Furthermore, use cases (consumer IoT, and IIoT), bring another filter of requirements and constraints that IoT devices must support and account for. Complicating these matters further is that with use case areas such as IIoT have protocols that are still in flux, creating ongoing challenges for authentication approaches.

There is a growing need to evaluate and streamline the methods adopted for device and service authentication over constrained IoT networks. This includes three potential classes of IoT devices (similar to IETF RFC 7228 on Terminology for Constrained-Node Networks):

- Class 0 (minimal) devices have little or no hardware capacity to sustain software that might be required for authentication.
- Class 1 (moderate) devices have a limited capacity (“headless devices”) for cryptographic key generation/storage or software agents but vary from type to type.
- Class 2 (full function) devices have authentication capabilities similar to mobile phones and are capable of sustaining authentication functionality used today.

Standard authentication techniques, such as public-key methods, can be adopted to serve IoT use cases. For example:

- Public-key certificates often leverage elliptic curve cryptography algorithms and optimized template formats to meet the needs of smaller devices. These methods apply to Class 2 and Class 3 devices.
- RFC 8628: OAuth 2.0 Device Authorization Grant extension enables devices with no browsers, or unconstrained devices (i.e., Class 1) aid in the bootstrapping of IoT devices.
- The ACE working group within IETF is also specifying how OAuth 2.0-based authentication and authorization exchanges can be optimized for constrained devices for use over Constrained Application Protocol (CoAP), Message Queuing Telemetry Transport (MQTT) and other messaging protocols.

While still emerging, blockchain-based methods promise an alternative approach to ensuring device integrity and availability. Blockchain could also act as a mechanism for the secure delivery
of cryptographic keys.

**User Advice:** Security and risk management leaders focused on IAM and IoT security must:

- Catalog and establish identity assurance requirements and capabilities for each category of devices in their IoT network. Leverage device- and network-based contextual information to gain additional assurance.

- Evaluate and adopt a centralized authentication framework that supports the range of device types (Class 0, 1 or 2) within and across the IoT realms in operation.

- Understand assurance requirements as Class 2 devices identify and authenticate users. Most user authentication methods, like device-based public-key or biometric methods (such as fingerprint) meet assurance objectives but often do not scale to the needs of IoT implementations.

- Make use of trusted computing techniques, such as Trusted Execution Environment (TEE) or Hardware Root of Trust (HRoT), that help to protect against physical attacks on devices and sensors; but also against the external software attacks that could enable unauthorized reading, analyzing and manipulating of software code elements on the devices.

- Know when to inspect and adapt, and when to inspect and adopt when assessing and architecting identity into IoT devices. In many brownfield cases the devices can't be secured and instead need to be protected with other mechanisms such as gateways, software defined networks or even physical security.

**Business Impact:** Security and risk management leaders focused on IAM and IoT security must:

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As IoT finds widespread applicability, ensuring the identity and integrity of entities connected to each other by means of reliable authentication and control mechanisms is crucial. The constrained nature of many IoT devices opens new attack vectors and vulnerabilities using the security threats that apply to IP-based networks. These vulnerabilities could be exploited to introduce a range of threats targeted at compromising security and performance of IoT devices. Custom IoT implementations across multiple devices and IoT realms in industries such as healthcare, logistics and supply chain, smart homes, smart grids, automotive transportation, and retail will benefit from emerging IoT authentication standards. Ultimately, overtime, IoT authentication will eventually have a strong influence on the IoT architectures and security controls in other industries at the enterprise level.

**Benefit Rating:** High

**Market Penetration:** 1% to 5% of target audience

**Maturity:** Emerging

**Sample Vendors:** Amazon Web Services (AWS); Device Authority; DigiCert; Entrust Datacard; Infineon Technologies; Intel; Keyfactor; Microsoft; PrimeKey; Sectigo

**Recommended Reading:** “Architecting Identity for the Edge of IoT Innovations”

“IoT Security Primer: Challenges and Emerging Practices”

**At the Peak**

**Live Commerce**

**Analysis By:** Sandy Shen

**Definition:** Live commerce uses live video streaming to demonstrate products and interact with shoppers in real time to encourage purchases. It is typically delivered through mobile apps and the live streaming function can be embedded in commerce platforms, or offered by online marketplaces and social networks with purchase links or check-out functions.

**Position and Adoption Speed Justification:** Live commerce had seen strong adoption in China before COVID-19, and Credit Suisse estimated the market reached $5 billion in 2019 (see Isentia publication “How To Generate Sales Through Live Streaming?”). The service saw huge spikes during COVID-19 when many businesses were forced to use digital channels and live commerce was attractive due to its quick launch time and little technical expertise required. Leading live streaming platforms such as Douyin and Kuaishou with a combined user base of close to one
billion have become important traffic sources. Some organizations reported encouraging data where they reached as many visitors in a three-hour streaming session as they would have from physical stores in six months (see OMR publication “China’s Thriving Livestream Sector — And How Small Retailers Can Use the Format”). Online marketplaces such as Taobao, JD and RED have also launched live commerce channels integrated into the marketplace, offering a seamless check-out experience.

Outside China, the service hasn’t seen much adoption as live streaming is mostly used for digital content and services such as performing art, literature, entertainment and fitness. Amazon has launched Amazon Live in the U.S. for a selected amount of merchants to showcase products with limited adoption, and social networks such as Facebook, Instagram and Twitter have live streaming function but not well-integrated with the commerce experience. In addition, many consumers have not gotten into the behavior of using live commerce which can be time-consuming and exhausting.

Live commerce faces challenges in brands discovery as there are tens of thousands sellers broadcasting at the same time, and products typically sell at deep discounts to lure shoppers. Organizations need to have a strategy to upsell from a few loss-leading products so they can justify the investment. Delivering a quality show experience requires detailed planning and professional setup to ensure the scene can support the brand positioning. They also need to design mechanisms to retain customers so they will come back for repeat purchases. These challenges will see the service taking at least two years to reach plateau.

User Advice: Organizations considering live commerce should:

- Decide whether live commerce is the right channel for your products. If so, work with marketing to increase visibility of your channel and design the experience relevant for shoppers. Be aware that the majority of live commerce shoppers are younger consumers between ages 18 to 35.

- Work with merchandising to select a few products that can be offered at attractive pricing points and define the supplies enough to increase brand awareness, generate traffic while curtailing the costs.

- Identify the live commerce platforms you want to have your presence on based on customer experience for interactions and purchases. Be aware that integration may be needed when embedding live streaming in the commerce platform and integrating the check-out experience with social networks.

- Design mechanisms, once the shopper comes to the product/check-out page, to upsell and encourage future purchases.

- Identify use cases that can leverage live streaming functions but for a more tailored experience. Retailers and brands have used live commerce in a one-to-one setting to allow store staff help customers find the right products and provide personalized support.
- Provide training to employees to prepare them for live commerce, and align incentives to encourage active participation.

**Business Impact:** Live streaming can increase brand awareness and generate large amount of traffic in a short time, and have low entry barriers that anyone with a mobile phone can set it up. Organizations with limited digital presence can set up commerce presence in a few days and those with established commerce presence can bring more traffic to the site. As the service mostly targets younger consumers and sells products at deep discounts, it can have impacts on profitability and brand positioning. Setting up live streaming without careful planning can potentially tarnish the brand image and deliver poor ROI if unable to retain customers or upsell.

**Benefit Rating:** Moderate

**Market Penetration:** 1% to 5% of target audience

**Maturity:** Emerging

**Sample Vendors:** Alibaba Group; Douyin; Facebook; HERO; Instagram; JD.com; Kuaishou; Shopee; Tencent; Xiaohongshu

**Recommended Reading:**
- “How the COVID-19 Coronavirus Has Changed the B2C Marketing Approach in China and What Western Brands Can Learn”
- “Cool Vendors in Retail for Excellent Execution of Customer Expectations”
- “What’s Hot in Digital Commerce”

**Payments as a Packaged Service**

**Analysis By:** Dayna Ford

**Definition:** Payments as a Packaged Service (PaaPS) is a service which enables nonpayment B2B businesses to offer payment processing to their merchant customers, or "submerchants," which enables them to accept payments from their end-buyer customers. Also known as marketplace payment offerings, PaaPS products include two key components above and beyond normal merchant payment processing:

1. Automated onboarding of submerchants via APIs.
2. Automated funds distribution to submerchants, without requiring any funds handling by the merchant.

**Position and Adoption Speed Justification:** PaaPS offerings are gaining momentum as a way for commerce merchants and software companies to create a new revenue stream and increase the cohesiveness of their existing solution by adding in payment capabilities. Pioneered by digital
wallets, other payment companies and gig economy businesses, PaaPS payments have become an attractive opportunity for any business well-positioned to connect buyers and sellers.

Established payment vendors such as Stripe and Braintree (part of PayPal) have offered this functionality for years and power the payment capabilities of software businesses like Shopify, Mindbody, Uber, Lyft and more. It is only recently that this model has become popular enough to inspire the introduction of payment vendors focused wholly on PaaPS. These include recent startups such as Finix, Payrix and Infinicept.

Even with the enablement of these payment technology partners, payments is a complex business and requires cross-functional expertise and resources and may not be for every business. We expect PaaPS to reach the Plateau of Productivity in no sooner than five years, due to the operational risk, and complexity and inherent inertia of legacy payment infrastructure that create adoption headwinds.

User Advice: Businesses interested in expanding into their product offerings to include payments should:

- Critically analyze the risk-reward equation for your business. Define the use cases and customer value proposition that you will support and how this technology will accelerate or enhance that.

- Evaluate and understand the “payment facilitator” distinction and whether it is important for your business. Payment facilitator is a card brand (Visa, Mastercard) distinction defining third-party agents that may sign a merchant acceptance contract on behalf of an acquirer and receive settlement of transactions from the acquirer on behalf of sponsored merchant. While this model captures the likes of digital wallets like PayPal and payment vendors such as Toast and Square, it also includes software companies like Mindbody and Shopify. It is important to note that B2B2C businesses in nearly any vertical can participate in the marketplace payment model, and share in the risk-reward equation of payments, without becoming a recognized payment facilitator in the eyes of the card brands.

- Evaluate the technology implementation requirements and cost structure of the various available vendor solutions. Determine how much development investment your organization wishes to bear, if any, or if you can outsource all or most of the technology to a third party.

- Evaluate and understand the different pricing models that apply when offering payments as part of your product. Your business may benefit from facilitating the payments as part of a bundled marketplace revenue share model. Or your business may prefer to offer its payment option as a stand-alone service, competitive to other third-party options, and priced distinctly based on its own value proposition.

Business Impact: Industries such as commerce software, gig economy, real estate, and any business embarking on enterprise marketplace are the early adopters. Offering payment processing services to customers can be an elegant way to enhance your organization’s overall
value proposition while removing an unnecessary friction point. Many businesses, especially small and midsize businesses, neither have nor desire to have payment expertise in-house. If these are your customers, enabling them to avoid a separate technology purchase decision and contract to maintain will likely be seen as a value-added service, for which they will be eager to award the business to you. PaaSPs are not a good fit for B2C businesses, as the value proposition is dependent on business customers connecting to end customers and accepting payments on their behalf.

**Benefit Rating:** High

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Adyen; Finix; Infinicept; PayPal; Payrix; Stripe; WePay

**Recommended Reading:**
- “Navigating the Digital Commerce Payment Market”
- “Market Guide for Digital Commerce Payments”
- “11 Imperatives When Building an Enterprise Marketplace”

**Visual Search**

**Analysis By:** Sandy Shen; Christina Klock

**Definition:** Visual search enables information search by using images or visual navigators. Image searches find similar products in the catalog or from a video, and visual navigators allow product search and filtering by predefined attributes. Other common use cases of visual search include face recognition and text search supported by Optical Character Recognition (OCR).

**Position and Adoption Speed Justification:** Visual search is a popular function in fashion, beauty and home decoration/furnishing verticals for digital commerce, and can also bring great value for B2B organizations especially in industrial manufacturing to enable quick identification of parts and components. Major marketplaces such as Taobao/Tmall and Amazon, search platforms such as Google and Bing, social networks such as Facebook, Instagram and Pinterest have incorporated visual search into their platforms. Retailers such as ASOS have “shop the look” function to allow customers find similar products. Others have used “complete the look” to recommend products that can work as a set or allow customers to click on items in the shoppable video and go to the product page.

Image search uses computer vision and machine learning technologies to recognize attributes and match patterns. The technology is quickly maturing with an error rate of less than 5%. The limitation of the technology in digital commerce is often the size of the catalog — whether similar products exist and how far off they are from target images. Visual navigators require deep tagging of product attributes and typically require disparate model for each attribute. Visual navigator can
avoid zero-result searches as customers are confined to the defined attributes in the catalog.

Compared to pure image search, visual navigator requires more industry expertise and AI capabilities. Visual search is currently mostly used for B2C commerce and is yet to be widely adopted for B2B. Therefore, the technology is not likely to reach plateau within the next two to five years.

User Advice: Organizations in verticals where visual experience can add value to the shopping experience should:

- Define the visual experience that can add value to the buying experience. It can be visual search or visual configuration, which are two different technologies with visual configuration being very mature. If visual search is the ideal solution, decide whether you need image search or visual navigators. Be aware that visual navigators require more sophisticated solutions with few proven vendors in the market.

- B2B organizations should investigate how visual search can bring value to the sales or service processes in product search, parts identification and ordering.

- Design multiexperience customer experience by combining visual technologies with other modality such as voice, text and emotion to maximize the value of the technology.

- Investigate vendor capabilities in terms of catalog tagging speed/accuracy, search accuracy/relevance, and whether they have supporting offerings such as product recommendations, personalization and analytics.

- Understand the resources and skills required from your in-house team. It may require your marketing and merchandising team to work with IT and the visual search vendor for deployment.

Business Impact: Visual search enables commerce organizations to deliver a differentiated customer experience by enabling effective and efficient product discovery. Visual search can improve conversion rate and order value as customers can quickly find their desired products, and improve efficiency in sales and customer service. It works better for businesses with large catalogues and/or lots of variants where quick product identification is a challenge.

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Clarifai; Donde; Kibo; Malong Technologies; Syte; ViSenze

Recommended Reading: “Market Guide for Digital Commerce Search”
Digital Shelf Analytics

Analysis By: Jason Daigler

Definition: Digital shelf analytics applications provide brands, manufacturers and consumer packaged goods (CPG) companies with data from the digital channels where their products are sold, such as online marketplaces and retailer digital commerce sites. These applications either scrape websites or consume data from APIs to provide performance metrics. Less frequently, DSA applications serve retailers by providing insight about product listings on social sites or marketplaces, or by providing competitive pricing information from other sites.

Position and Adoption Speed Justification: The proliferation of digital shopping options is causing products to be sold via an increasing number of channels. This creates complexity for brands, manufacturers and retailers who are trying to optimize product content, positioning, compliance and prices across a vast set of digital commerce sites, marketplaces and social channels. Managing this content manually with internal resources is not a scalable process for many organizations. Coupled with the valuable insight they can provide, such as competitive pricing and product content optimization suggestions, there is an emerging need for digital shelf analytics (DSA) applications. These applications have been around for more than five years, but they have not yet been widely adopted outside of the very largest CPG companies. As digital sales channels continue to shift, it will likely take another two to five years before these applications are widely adopted by CPG companies.

User Advice: Potential adopters of DSA applications, such as CPG companies or retailers, should:

- Compile data from internal systems to understand all of the channels where products are currently sold and the available data used to define the performance of products in those channels.

- Treat DSA applications as a means to not only monitor performance of the company’s products on digital shelves, but also as a way to develop competitive insights against other companies’ products.

- Avoid operating DSA applications in a silo. Develop processes to create a “closed loop” whereby the DSA applications can uncover insight and then changes can be made in other systems such as digital commerce, marketing and merchandising to optimize performance. This may require integration between the DSA application and other systems.

- Assess their ability to ingest and respond to insights derived from DSA applications. Either develop or select a vendor who can provide a “closed loop” system or set of processes, whereby companies can gather insight from a DSA application, make necessary changes in a product...
data repository such as a product information management (PIM) solution, resyndicate product content to the digital shelf, recheck the content and continue the cycle again.

**Business Impact:** For brands and manufacturers, DSA applications provide visibility and the necessary data to make changes to their products on the digital shelf. This will, in turn, improve search algorithms, pricing policies and page designs. Companies can also benefit from improved search positioning, better compliance with retailer specifications, responsiveness to ratings and reviews, and monitoring minimum advertised price (MAP) violations. All of these changes will ultimately result in better product findability, higher conversion rates, and more high-quality brand representation.

For retailers, where sales do not typically happen on other retailer sites and less frequently on marketplaces, data and insight returned from DSA applications will primarily emanate from social channels or other locations where the retailers syndicate their products. Retailers can benefit from competitive pricing insight and promotional information. They can also gain visibility to new product additions from competitors and identify internal assortment gaps and competitors’ assortment gaps.

**Benefit Rating:** High

**Market Penetration:** 1% to 5% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Ascential; Dataweps; DCI; e.fundamentals; Mobius Knowledge Services; Profitero; Salsify; Stackline; Syndigo

**Recommended Reading:** “Innovation Insight for Digital Shelf Analytics”

**Immersive Commerce**

**Analysis By:** Marty Resnick

**Definition:** Immersive commerce blends the physical and digital worlds by using advanced digital technologies such as augmented reality (AR) and virtual reality (VR) to enhance customer experiences. The goal of immersive commerce is solving customer problems, easing the purchase process and forming brand loyalty by building emotional engagement.

**Position and Adoption Speed Justification:** Customer experience is a key competitive differentiator as digital business matures and the past focus on transactional efficiency becomes a commodity. Technology is pervasive to how customers interact with brands. VR and AR technologies remain nascent in market penetration, but successful applied use cases are growing in number.

VR can provide a 3D visual of complex products and contextualized environments. This product visualization improvement is increasingly found in configure, price and quote (CPQ) modules used
in B2B commerce to render a visually accurate 360-degree view of a multicomponent product (i.e., houses and rooms). This advancement allows customers to self-serve rather than conduct lengthy sales calls as part of a purchase decision.

AR is used to show the look and feel of a product on the customer or in a physical environment. For example, customers can try products such as clothes, sunglasses and makeup using an app or in front of the smart mirror to see how they fit. They can see how a product fits into a real environment, such as furniture in a living room. Customers or field engineers can improve efficiency or accuracy by using AR to identify faulty parts, access manuals, select replacements or assemble products.

Immersive commerce using VR is at a very early stage, and adoption is limited mostly to the CPQ module (i.e., visual product configuration) and virtual simulations (e.g., test drives). This is due to the requirement for head-mounted displays (HMDs), intensive processing power, complex visual content development and the lack of transaction integration into the visual scene. AR is maturing faster than VR, as the use cases for AR are abundant and can be deployed on mobile devices without HMDs. We expect the technology will take at least five years before it reaches plateau.

User Advice: Businesses interested in leveraging immersive commerce should:

- Treat AR and VR as separate technologies. Articulate customer value by identifying use cases specific to each immersive technology type. Start with a minimum viable product pilot of each technology with a focus on business outcomes. Feed the results into an ROI analysis to justify the investment.

- Evaluate vendors based on the actual performance and initial investment — such as the use of special hardware and user training — and whether they can support a multichannel experience. Ensure the virtual experience blends well into the existing customer journey and digital commerce experience.

- Integrate AR/VR with the digital commerce ecosystem to leverage existing assets such as product catalogs, web content management (WCM), promotions, personalization, CPQ and workflows to maximize both business and customer benefits.

- Start with 360-degree video and 3D renderings for configurable product, as that technology is easier to deploy compared to VR technology.

- Add augmented reality capabilities to existing mobile commerce apps, especially for configurable or personalized products that can leverage the phone camera for better visualization.

- Bring in subject matter experts to help you get started. Form an innovation lab, and allow developers to work alongside experts to bring key technologies into your portfolio of skills.
Business Impact: Industries such as retail, CPG, travel, automobile, fashion, manufacturing and real estate are the early adopters, as are B2B sectors that heavily rely on 3D visualization in CPQ tools. Organizations using VR can enhance the decision-making process by showing how the final product/destination looks to customers before they invest in the product. AR provides use cases that are less immersive but more readily available with the use of mobile phones. When integrated into the existing digital commerce platform and customer experience to address specific problems, immersive technologies can be powerful in increasing customer loyalty and improving business revenue. Businesses deploying immersive commerce just for the novelty effect won’t gain much benefit including improving associates ability to sell and enhancing customer self-serve experiences.

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Augment; Cappasity; Google; IBM; KBMax; Matterport; Microsoft

Recommended Reading: “Three Best Practices to Optimize Digital Commerce for Visual Experiences”

“Evolve Digital Commerce Portfolios by Leveraging the Application Ecosystem”

“How Architecting for Next-Generation Experiences Helps to Deliver Customer and Business Outcomes”

Distributed Order Management

Analysis By: Joanne Joliet; Max Hammond; Tom Enright

Definition: Retail distributed order management (DOM) applications orchestrate and optimize the customer order fulfillment process to deliver target service levels in terms of fill rate; accuracy of orders; and on-time, cost-effective delivery.

Position and Adoption Speed Justification: DOM is a growing solution in the retail market, enabling retailers to optimize order fulfillment on time, in full while optimizing fulfillment costs. The core components of DOM include:

- An enterprise view of inventory available for order fulfillment
- Details of customer orders for fulfillment
- A configurable rule engine that determines and orchestrates how orders can be fulfilled from available inventory
Retailers transforming from multichannel to unified commerce need DOM to support fulfillment across touchpoints and enable agility. Many retailers still fulfill customer orders either using legacy systems that were not designed to support unified commerce or by integrating other systems, such as ERP, warehouse management systems (WMSs) and e-commerce platforms. In addition to shipping, customer interest in click and collect, whether retrieved at the service desk, at the curbside or at a locker, are becoming a basic expectation as it affords both convenience of shopping and immediacy in fulfillment. DOM solutions will also continue to evolve to support more retail use cases such as managing back orders, preorders, split and partial shipments. Furthermore, delivery models have expanded to include alternate site pickup, delivery into a customer’s home or auto, mobile hot spot, or delivery by autonomous vehicles, drones or robots. Not only will delivery locations and means vary, those actually conducting the fulfillment, such as pickers, could be store associates, third-party contractors, or even individuals as the “share economy” model continues to become more accepted. Unified commerce retailers will need to support an even greater ecosystem for product distribution to meet customer expectations for fast and flexible fulfillment.

Retail DOM is positioned at pre-peak 10%. This reflects the increasing levels of hype and implementation over the last 12 to 18 months as retailers progress through their digital transformation efforts to support increasing complexity in unified commerce ordering and fulfillment processes. During this period, retailers have expanded their justification for investing in a DOM system into more use cases, resulting in interest from an increasing number of retailers in this technology. This new, wider retailer market has reduced market penetration from its position on previous Hype Cycles while likely accelerating the time to plateau as urgency levels in investment increase. Additionally, the COVID-19 pandemic has accelerated this as retailers have worked to add new fulfillment options to their offering as they improvised to divert fulfillment, which could have been handled by DOM.

Current adoption rates of this expanding portfolio of interested retailers are between 5% and 20% in the retail market, with demand across both food and nonfood retail segments. Grocers and mass merchants have been ahead of the balance of retail to implement curbside and delivery options, to remain competitive, but COVID-19 has caused significant demand for these services. However, all retailers must be positioned to meet customer demand for fulfillment, especially as grocery sets the expectation for consumers. As retailers look to accelerate investment decisions and deployments, we expect retail DOM to take two to five years to reach maturity on the Plateau of Productivity, as more retailers move toward implementing unified commerce to satisfy customers’ expectations on flexibility, choice and timing of fulfillment. Over the past year, we have also seen increased interest in DOM systems from outside the retail industry. This includes brand manufacturers selling on marketplaces, as well as B2B suppliers in the food industry, in particular.
User Advice: Retailers who have not implemented DOM will struggle to scale as customer preferences will increase fulfillment complexity. Retailers need to strategically plan for current fulfillment demand, as well as what may materialize in the future. To start, retailers should:

- Create process maps for the multiple permutations of the various ways a transaction can be ordered and fulfilled, considering both business and consumer processes.
- Ensure the accuracy of perpetual inventory that will feed DOM.
- Identify current integration points between DOM and other applications involved supporting the order, including all digital and physical touchpoints.
- Ensure there is no conflict between other applications or platforms which may include this capability, including POS and the unified commerce platforms in which they sit.
- Build the logic and algorithms appropriate to the category; these will be different between food and nonfood retailers as well as how inventory is allocated to stores.
- Carefully consider your workforce strategy with respect to executing fulfillment, including the human workforce, third-party workers and automation.
- Consider adjacent technologies which can support fulfillment activities, like RFID, smart shelf, mixed reality, microfulfillment, smart robots and other technologies.
- Emphasize the importance of communication to the associate and the customer as much as the solution functionality, to ensure efficiency and expectations are set.
- Consider DOM vendors with unified commerce functionality and begin planning for the selection process.

Business Impact: With DOM, retailers are better positioned to handle the complexity of unified commerce order management and fulfillment, especially multiple fulfillment types in a single order as well as accommodating customer order changes midfulfillment. DOM helps retailers improve order fill rates, increase the accuracy of order picks, improve delivery on time, shorten cycle times, reduce the cost of order management, reduce the amount of buffer stock, optimize shipping on delivery and leverage new fulfillment strategies to successfully provide a unified commerce experience.

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Sample Vendors: Aptos; Deposco; enVista; Fluent Commerce; IBM; Manhattan Associates; Oracle; Radial; Symphony RetailAI
Recommended Reading: “What Is Retail Distributed Order Management and Why All the Fuss?”

“Best Practices for Implementing Retail Distributed Order Management Systems”

“How Retailers Can Master Buy Online, Pickup in Store”

Enterprise Marketplaces

Analysis By: Jason Daigler; Sandy Shen

Definition: Enterprise marketplaces are digital channels operated by B2B or B2C sellers who invite third-party sellers to sell directly to end customers. Marketplace operation applications provide the technology to enable enterprise marketplaces by allowing operators to manage vendor onboarding, product catalogs, order routing and management, and vendor compliance with marketplace policies.

Position and Adoption Speed Justification: Enterprise marketplaces saw increasing interest during COVID-19 as many organizations hastened to launch or expand digital commerce presence as sales from physical channels dried out. Businesses dealing with a large number of partners such as retailers, industrial manufacturing, healthcare, chemical and property development are early adopters. Organizations view this business model as a way to expand their assortment, generate new revenue, engage customers and partners, and transition to digital business.

Marketplace operation applications enable organizations to create a marketplace platform where sellers can manage their product listings, inventories and orders. These applications can be an overlay on top of existing commerce platforms or end-to-end solutions that combine the commerce engine and marketplace module. Historically, marketplace operation functionality was typically not a native part of the digital commerce platform. However, today an increasing number of commerce platform vendors are adding marketplace functionality in response to the rising market demand. Additionally, there has been increased interest among Gartner clients for marketplace operation applications that layer on top of digital commerce platforms.

The success of enterprise marketplaces as a business model hinges in large part on business operations. Top challenges include:

- Ability of the marketplace operator to recruit a sufficient number of qualified sellers with a rich product assortment
- Capabilities for sellers to actively promote their storefront or product listings on the marketplaces
- Ability of the marketplace operator to drive enough traffic to the marketplace and offer a quality experience for both sellers and buyers
Based on the challenges and the transformational nature of the business model, we expect enterprise marketplaces to reach the Plateau of Productivity no sooner than another two to five years.

User Advice: Application leaders responsible for digital commerce technologies should:

- Evaluate existing product categories to see whether they could be augmented and complemented by third-party sellers. The augmentation of existing categories should occur before adding completely new categories.

- Ensure consistent customer experiences through the marketplace across products sold by the operator and third-party seller. Product specifications, ratings and reviews processes, loyalty and rewards programs, shipping/returns policies and processes, and customer service processes should all be consistent, regardless of who ultimately owns the product.

- Define a win-win monetization model for the operator and sellers. Revenue can come from listing fees, sign-up fees, membership fees, transaction fees, payment processing fees, and value-added services such as fulfillment, advertising and advanced analytics.

The marketplace operation application should manage all aspects of vendor onboarding and vendor policy adherence. For large customers that require B2B punchout integration, work with technology vendors or develop your own solution. This can be a competitive edge for the marketplace and also helps onboard large customers that may be reluctant or not allowed to use outside commerce platforms for compliance reasons.

Business Impact: Enterprise marketplaces allow organizations to shift their business model from linear digital commerce where they sell directly to end customers to a platform business where they facilitate transactions between sellers and buyers. When done right, organizations can enrich product offerings, reduce selling or procurement costs, test new items or categories before adding them to the product catalog, and improve the customer experience by making the process more transparent and efficient. When marketplaces become more sophisticated by connecting a large number of ecosystem partners, organizations can smoothly transition into digital business by owning their digital ecosystem and creating digital revenue. Therefore, this technology has a “high” benefit rating.

The enterprise marketplace model appeals to organizations that can benefit from ancillary products beyond their core offering as well as those with a large number of partners. Examples include retailers, distributors, manufacturers and organizations with large procurement operations. B2B commerce businesses that onboard large numbers of vendors to serve a broad customer base are also an excellent fit for the marketplace model.

Benefit Rating: High

Market Penetration: 5% to 20% of target audience
Maturity: Adolescent

Sample Vendors: AppDirect; Avetti Commerce; Broadleaf Commerce; commercetools; IZBERG; Marketplace; Mirakl; Omnify; Spryker; VTEX

Recommended Reading: “11 Imperatives When Building an Enterprise Marketplace”

“Create Enterprise Marketplaces to Accelerate Digital Business”

“Balance Marketplaces and Direct Channels for Digital Commerce Growth and Customer Engagement”

Smart Check-Out

Analysis By: Joanne Joliet; Max Hammond; Kelsie Marian

Definition: Smart check-out converges various digital technologies to recognize selected products, sum up the total basket cost, apply loyalty and promotional benefits, identify the customer and receive payment, thus eliminating the need to go through the traditional physical check-out lane.

Position and Adoption Speed Justification: Smart check-out implementations continue as retailers strive to offer customers a quick and convenient experience, as well as explore it as a way to increase contactless interactions in stores. Implementations are still predominantly in the grocery, fresh food and convenience segments, with increasing interest for stadiums and airport venues.

Gartner defines smart check-out in three models:

- “Scan & Go” — using a mobile device, a customer or associate to scan each selected product as they shop and either pay through the app or a kiosk before leaving the store.

- RFID — RFID-enabled check-out facilitates faster scanning of products as a customer checks out, either by self-check-out or associate-assisted check-out.

- “Go style” — uses a combination of extensive network of cameras, computer-vision, AI, sensor-fusion, machine learning and mobility to allow customers to be identified, track product selection and digitally remit payment as they leave the store. In addition, some vendors offer a microstore concept, like BingoBox or others, rather than retrofit existing stores.

Smart check-out is currently positioned at prepeak 10%. Customer expectations for greater convenience and speed while shopping have steadily driven new implementations. Amazon’s recent announcement on the commercialization of their “Amazon Go” solution has sparked further interest. More recently, COVID-19 and the need to reduce associate-customer interactions has created a new use case. The list of smart check-out vendors continues to grow. Several traditional POS vendors now include mobile “Scan & Go” functionality in their offerings. Retailers already using RFID are now exploring using it for check-out. “Go style” check-out has a growing list of startups offering solutions, with some leveraging computer vision at the cart or at self-check-out.
rather than the entire store to address scalability issues for large formats. Implementation of the supporting technologies like mobility, AI, or RFID, will further propel adoption. While smart check-out is more conducive for some retail segments, market penetration is still less than 1% of the target audience as implementations are still limited and the path to productivity for retail as a whole remains at five to 10 years.

**User Advice:** Regardless of the smart check-out model, challenges remain around transaction accuracy and fraud, scalability, and overall cost. Each of the smart check-out models are not fraud-proof. AI-powered check-out can fail if the computer vision is obstructed due to customer density for example. Scan avoidance or scanning a lower cost item are common issues with mobile Scan & Go. Accuracy of RFID check-out can be impeded if the tags are removed, shielded or altered so they can't be recognized. As a result, retailers need to modify their loss prevention processes to include additional monitoring, audits and/or accept the loss.

Consider each of the smart check-out models to address customer expectations for convenience, speed and self-service, as well as your requirements to reduce associate customer interactions, including:

- Assess the entire customer journey to ensure the friction isn't shifted from check-out to another point of the experience, like bagging purchases for example.

- Evaluate the various smart check-out models against your current and planned store formats, as well as your workforce strategy. Do this to identify which are conducive given size, or if potentially a hybrid approach could be used for a smaller section within a larger store.

- Consider other technologies which can also deliver smart check-out capabilities like smart shelf and real-time IoT platforms and avoid overlap.

- Review the store digitalization strategy, especially given other technology changes accelerated by COVID-19, to see which can contribute to or deliver a smart check-out shopping experience.

- Partner with HR and loss prevention to assess requirements for reduced associate-customer interactions and to identify weaknesses in the smart check-out shopping process.

- Consider the data generated by smart check-out and the intelligence that it will provide for improvement in merchandising and assortment decisions, predicting and preempting customer needs, as well as driving in-store execution.

- Explore the ability to couple smart check-out with real-time contextualized pricing based on customer loyalty and product preferences.

**Business Impact:** The most significant benefit of smart check-out is the data that is generated by tracking customers, identifying shopping behaviors and capturing individual preferences while they shop. This data can be individually used for greater personalization and recommendations, as well
as seeing trends across customers in a given market in real-time. Secondly, smart check-out can reduce interactions between associates and customers, as health and safety are a top priority due to COVID-19. Lastly, loss prevention should reassess weakness points for theft or shrink associated with smart check-out, especially since control of check-out process will dramatically shift from store associate to the customer.

**Benefit Rating:** Transformational

**Market Penetration:** Less than 1% of target audience

**Maturity:** Emerging

**Sample Vendors:** AiFi; Amazon; AWM SMART SHELF; Caper; everseen; grabango; NCR; Standard Cognition; Trigo; Zippin

**Recommended Reading:** “Retail Digital Transformation and Innovation Primer for 2020”

“Preparing for the AI-Based Retail Nervous System”

“Grand Reopening: Retail Playbook for Stores Post COVID-19”

“A New Normal: Retail Store Associate Playbook Post-COVID-19”

**Consent and Preference Management**

**Analysis By:** Andrew Frank

**Definition:** Consent and preference management platforms consolidate end-user choices regarding how their personal data should be handled. Choices are synchronized across a variety of legacy, active and incoming repositories, both on-premises and in the cloud. The intent is to extend visibility and control to consumers, allowing them to determine and change at will how much of their data to expose, to whom and for what purpose. This also empowers marketers to respect their choices with a minimum of manual overhead.

**Position and Adoption Speed Justification:** The EU’s General Data Protection Regulation (GDPR), California’s Consumer Privacy Act (CCPA) and a global wave of privacy legislation initiatives coupled with deprecation of browser-based tracking mechanisms are driving peak demand for consent management solutions. Offerings have evolved rapidly to meet demand but the details of implementation prove challenging for many organizations.

Obstacles include legal frameworks that vary materially by region, compliance requirements that make for challenging customer experience design, and integration challenges that span multiple legacy systems and lack standard metadata definitions and guidelines. Organizations adopting consent and preference management platforms (CPMPs) face the challenge of assembling cross-functional teams consisting of legal, technical, and marketing resources.
CPMP projects are frequently underscoped as vendors overpromise what can be accomplished with out-of-the-box solutions and integrators confront the complexity of managing granular consent options and satisfying rights requests that can impact multiple internal and external datasets. Marketers, meanwhile, seek an elusive balance. Forcing too many privacy choices on consumers can degrade user experience and lead to high opt-out and abandonment rates. Offering too few privacy choices can limit the legal ability to process data to understand customer behavior and offer tailored experiences, or raise compliance questions when data is processed without unambiguous consent. CPMP providers have generally left front-end design solutions to their customers, where applicable skills and experience are in high demand. Lacking such skills, many marketers are tempted by “dark patterns” that attempt to trick or frustrate a user into opting in.

None of these challenges is conducive to a rapid solution. The legislative process is slow and most governments are preoccupied with coronavirus crisis management. Without consistent laws and enforcement, organizations must treat solutions as stop-gap while solution providers and standards bodies struggle to anticipate the details of controversial legislative outcomes. We anticipate a plateau horizon near five years with an extended journey through the Trough of Disillusionment as economies rebuild and power struggles among internet giants, privacy advocates, and commercial interests fail to find easy resolutions.

**User Advice:** Marketing leaders and security and risk management leaders responsible for collecting and using consent should:

- Avoid oversimplifying consent management requirements and assemble sufficient resources from across the organization to document requirements and evaluate solutions.

- Develop a consent matrix that defines types of communications granularly, and port existing customer databases into this new model. Use it to determine if a packaged CPMP solution is justified by assessing requirements against market options and internal costs.

- Break out consent collection and fulfillment requirements from subject rights request automation and treat them as complementary initiatives.

- Implement a formal review process for consent flow designs and work with designers and customer experience experts to create prototypes and test alternatives.

- Treat consent as a contextual and progressive customer experience. Test and optimize design trade-offs and quantify costs of consent flow options in terms of user abandonment and consent decline rates.

- Shift focus from legal requirements toward user-centric design. Long-term engagement between consumers and brands is only achievable if CPMP aligns with consumer goals and values.

**Business Impact:** Consumer brands face a growing trust crisis that threatens profitability and depletes brand value. As privacy regulations force brands to obtain advance consent for each
instance of personal data processing, the risk of habitual declines threatens to deprive marketers of their ability to offer personalized services and anticipate customer needs based on observed behavior. This further diminishes the value of brands to customers. The commercial impact of privacy regulation hinges on marketers’ abilities to craft compliant solutions based on articulating benefits to consumers. CPMPs are thus critical to building a trust-based relationship between consumers and brands that put consumers in control of their personal data. Business benefits include increased brand loyalty, customer satisfaction and retention levels, and competitive differentiation.

Meanwhile, consumer-facing digital platforms such as Google, Facebook, and Amazon are the most visible targets of privacy complaints and have the most at stake as governments contemplate how to reign in their massive personal data collection and processing operations. These providers devote massive resources to honing their consumer consent collection designs and justifications. The outcome of their efforts, along with the success of brands, directly influences whether personalization and ad targeting based on personal data will be concentrated in a digital oligopoly, distributed among brands in competitive markets, or simply disappear.

**Benefit Rating:** Moderate

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** BigID; Consentua; Crownpeak; LiveRamp; OneTrust; PossibleNOW; Salesforce; SAP; Tealium; TrustArc

**Recommended Reading:**
- “Market Guide for Consent and Preference Management for Marketers”
- “Market Guide for Subject Rights Request Automation”
- “Survey Analysis: Consent and Preference Management Platform Adoption Remains Low Despite Mounting Privacy Concerns”
- “Survey Analysis: European Marketers Favor Short-Term Flexibility in Tech Deployments Over Long-Term Strategy”
- “How to Minimize Your Marketing Data Dependence on Amazon, Facebook and Google”

**Customer Journey Analytics**

**Analysis By:** Jason Daigler; Lizzy Foo Kune

**Definition:** Customer journey analytics (CJA) is the process to track and analyze the way customers and prospects use a combination of available channels to interact with an organization over time. It covers all channels the customer has used, including those with human interaction.
(such as a call center), those that are fully automated (a website), those that provide assisted help to the customer (live chat and co-browsing), those that are operated in physical locations (a retail store) and those with a limited two-way interaction (advertising).

**Position and Adoption Speed Justification:** Customer journey analytics is a strategic priority for a variety of internal roles in several different industries, as application leaders and marketing leaders strive to gain a better understanding of customer acquisition, retention, satisfaction, advocacy and loyalty. In many cases, CJA initiatives begin as projects to create customer journey maps, which are snapshots of customer experiences for a given process. Often, organizations begin by manually mapping their perception of the customer journey without using data and analytics to track and measure journeys. For journey maps to become both more accurate and dynamic, organizations will ultimately need to power the journey maps with actual data. Without a clear strategy for capturing and linking the right data in each channel, organizations will lack a true understanding of the customer journey, beyond interactions wherein the customer is forced to reveal their identity.

CJA is accelerating in adoption as more applications begin to add elements of journey analysis into existing tools, such as customer data platforms, personalization engines, customer analytics applications, and multichannel marketing hubs.

**User Advice:** Customers hop from channel to channel over time, and as such organizations should not assume that continual investment in understanding customer behavior within a single channel will deliver more valuable insights than understanding the combination of channels they use. Similarly, organizations should be wary of key performance indicators (KPIs) that fail to consider the implications of customer activities in other channels, such as single-channel conversion rates. Starting with customer identification and journey mapping across only two to three channels, where data is both available and valuable, is an excellent way to start with CJA. The selected journey should also be one that is valuable to both the organization and the customer. Similarly, starting by manually mapping the internal perception of customer journeys is a reasonable starting point, as long as organizations intend to eventually validate the mapped journey with data and analytics. Organizations should also consider how they can orchestrate and automate journeys based on the insight gained from CJA; this will necessitate integrating CJA solutions, and specifically their outputs, into other internal systems.

As stated above, journey analysis functionality is becoming more frequently embedded into other systems, so organizations should evaluate their existing technology stack to see if they’re already paying for an application with journey analysis capabilities.

**Business Impact:** Organizations can obtain the following benefits from CJA:

- Higher customer satisfaction from more seamless and personalized interactions across channels.
Better understanding of the benefits that each interaction delivers to the overall journey, resulting in better allocation of investment to supporting the overall relationship.

Improved understanding of the interrelationships between different parts of the journey, allowing organizations to, for example, evaluate the expectations that are set in the beginning of a journey with the outcomes toward the end of a journey.

The ability to diagnose pain points in the customer journey across channels to aid business prioritization of CX projects.

More accurate customer segments, based on data from multiple channels as well as real-time data and predictive modeling, thereby increasing the effectiveness of marketing campaigns.

More successful personalization tactics — whether on commerce sites, communication channels or elsewhere in the customer experience — based on data that gives a more complete view of the customer’s activity in multiple channels instead of a single channel.

More relevant and efficient customer service for customer-facing agents who have a more complete view of the customer’s activities and difficulties, based on data from multiple channels.

More effective marketing, allowing media channels to be an extension of customer communications.

Improved customer experience and reduced customer churn through real-time next best actions orchestrated by insight gleaned from customer activity.

**Benefit Rating:** High

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Adobe; BryterCX; Cerebri AI; Kitewheel; Salesforce; Splunk; Teradata; Thunderhead; Usermind; [24]7.ai

**Recommended Reading:** “How to Run a Do-It-Yourself Customer Journey Mapping Workshop”

“Market Guide for Customer Journey Analytics”

“Technology Insight for Marketing Analytics”

**Digital Experience Platforms**

**Analysis By:** Irina Guseva; Gene Phifer
Definition: A digital experience platform (DXP) is an integrated and cohesive piece of technology designed to enable the composition, management, delivery and optimization of contextualized digital experiences across multiexperience customer journeys.

Position and Adoption Speed Justification: DXPs emerged because traditional approaches to creating, managing and delivering digital experiences across multiple channels were failing to meet escalating business and IT needs. The former WCM and portal vendors began delivering more comprehensive platforms for creating and managing digital experiences across multiple touchpoints of the customer journey. DXPs are now resonating with the buyers, and interest and awareness are still increasing, as they’re inching toward becoming a mainstream technology. As organizations embark on digital transformation programs, the interest for innovative DXPs will increase.

The most common deployment approach is to obtain the core platform from a single vendor, and then supplement it with best-of-breed technologies where functional gaps exist for addressing B2C, B2B and B2E use cases. An API-first approach, integration and interoperability are, therefore, key attributes. A DXP must be pluggable and extensible, and should easily integrate with adjacent technologies, such as digital commerce and CRM.

User Advice: Take the following steps:

- Identify the business outcomes you must achieve on the road to digital business success.
- Define the role of digital experience manager.
- Decide the capabilities and characteristics of your ideal DX platform.
- Make an inventory of the tools currently used for presentation management and presentation layer composition across all supported devices, channels and modalities.
- Identify overlaps and duplicate capabilities, as well as gaps.
- Pinpoint synergies where common vendors are identified.
- Demand that your vendors present their product roadmaps.
- Identify where and how integrations will occur.
- Explore the many vendor options available on the market, then draw up a roadmap to adopt a DXP during the next 12 to 36 months.

If you have already bought or built most of the components of a DXP, and are happy with them, fill in any gaps and pursue a do-it-yourself approach. If you are lacking major components, consider a DXP product as a source for the missing components. If you don’t have much of a platform, or don’t like most of the components you are using, consider buying a full product from a specialist provider.
vendor. For an agile, flexible DXP, look for extensive use of API models, cloud-native and incorporation of microservices architectures.

**Business Impact:** A poor digital experience results in a poor customer experience. DXPs help enterprises deliver compelling digital experiences for both internal customers (employees and citizens) and external customers (consumers and partners). Most enterprises deliver customer experience (CX) in silos, based on brand, product, or geography, which leads to poor CX. DXPs provide significant efficiencies in composition, management, delivery, contextualization and optimization of digital experiences across multiple touchpoints. The DXP addresses an enterprise's need for a consistent, integrated, versatile and optimized approach to CX across a wide range of engagement scenarios, audiences, channels, devices and modes. The integrated nature of a DXP can mean faster time to market and lower deployment costs, as well as higher levels of customer engagement and satisfaction.

**Benefit Rating:** High

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Acquia; Adobe; Bloomreach; Episerver; Liferay; Microsoft; Oracle; Salesforce; Sitecore

**Recommended Reading:** “Magic Quadrant for Digital Experience Platforms”

“Critical Capabilities for Digital Experience Platforms”

“Defining the Digital Experience Platform”

**Customer Engagement Hub**

**Analysis By:** Jim Davies

**Definition:** A customer engagement hub (CEH) is an architectural framework that ties multiple systems together to engage customers optimally. It enables proactive and reactive communication, as well as personalized, contextual customer engagement, using humans, artificial agents or sensors, across all interaction channels. It can also reach and connect all departments to enable, for example, synchronization of marketing, sales and customer service processes, as well as analysis of back-end and Internet of Things information and event streams.

**Position and Adoption Speed Justification:** A CEH is a core component of a digital business technology platform. By 2022, 60% of large organizations will extend their customer experience (CX) technology and process goals by tying together disparate systems in a holistic approach focused on the needs of customers. Additionally, departments such as marketing, digital commerce and sales will join with IT leaders to develop plans for CEHs. Even so, by 2022, only 40% of organizations will select the correct technologies to make a CEH work, and only just over 10% of
CEH architectures will include real-time event streaming, streaming analytics and continuous intelligence. The need to support the “anytime, anywhere” customer (on mobile devices, smart devices and social networks), together with the need for heightened business awareness, should make remedying these shortcomings a priority for IT leaders. This proliferation of devices, along with the vast permutations of digital touchpoints and interaction modalities, requires application leaders to transcend omnichannel and embrace a “multiexperience” UX concept to achieve greater CX outcomes in a world driven by digital experiences.

**User Advice:** Application leaders responsible for the CX (or for integration) and assisting chief marketing officers, digital commerce leaders and customer care directors should:

- Approach the idea of the CEH as a business strategy linked to a technology framework, rather than as a software product to be bought from the market.
- Test the fitness of CRM/CX-oriented applications to meet the needs of engaged customers.
- Examine vendors’ roadmaps and readiness — as well as of their own organization — to evolve customer engagement processes and technologies.
- Identify where to apply real-time continuous intelligence in their CEH by working with marketing, sales and service leaders. The objective is to optimize real-time, cross-process, cross-business-domain, context-aware decisions and achieve a positive ROI by closing key customer journey gaps.

**Business Impact:** Operational and technology silos will remain a norm that IT leaders must confront in large enterprises. In place of a “rip and replace” struggle, a focus on the emerging CEH will foster personalized and consistent engagement with customers, while gaining agreement from both IT and business functions.

The CEH will support a transition from transactional economics to a more comprehensive view of customer relationship economics. The topic of customer engagement and care will become a more systemic theme across enterprises of many types — in sectors ranging from retail to healthcare. As CIOs strive to fulfill their new mandate to deliver better business outcomes for their enterprises, a CEH will be required to support their efforts.

It is not yet clear how this requirement will impact the software market, but software vendors that neglect the shift will lose market share. At present, most components of a CEH are not bundled as a suite. There is a 40% likelihood that the CEH will remain a system of systems and never evolve into a product. As organizations plan to engage customers with a greater array of digital touchpoints and interaction modalities, multiexperience will become an increasingly important strategy aligned with CEH.

Vendors tend to focus on what can be mass-produced and easily sold, rather than on products that can transform a business but require complex buying centers and change management. This
limits the feasibility of a true CEH. However, the issue of siloed customer engagement efforts and processes is gaining the attention of business and IT leaders, as well as software vendors. We expect that large CRM software vendors will introduce new capabilities to bridge capability gaps by means of acquisitions, partnerships with system integrators, and their own research and development efforts.

There is a chance, therefore, that, in the next three years, one large CRM software vendor will offer a complete CEH solution. Such a solution could emerge to target the large-enterprise sector with a strong focus on hybrid architecture and integration capabilities. It would be the result of advances in service-enabled architectures, which tie together smaller suites. It could also emerge to target the midsize-enterprise market through a cloud-only approach.

**Benefit Rating**: High

**Market Penetration**: 5% to 20% of target audience

**Maturity**: Adolescent

**Sample Vendors**: Pegasystems; Salesforce; Usermind; ZineOne

**Recommended Reading**:
- “Prepare for the Impact of a Consolidating Customer Service Technologies Marketplace”
- “The Elusive CRM Magic Quadrant”
- “Make Your Customer Engagement Hub Real Time With Continuous Intelligence”
- “Technologies for CRM and the Emerging Customer Engagement Hub”
- “Ten Steps for Planning Your Customer Engagement Hub”
- “How to Build a Digital Business Technology Platform”

**Digital Ethics**

**Analysis By**: Jim Hare; Frank Buylendijk; Lydia Clougherty Jones

**Definition**: Digital ethics comprise the systems of values and moral principles for the conduct of electronic interactions among people, organizations and things.

**Position and Adoption Speed Justification**: Digital ethics remains at the Peak of Inflated Expectations. Digital ethics and privacy remain growing concerns for individuals, organizations and governments. Consumers are increasingly aware that their personal information is valuable, and they’re frustrated by lack of transparency and continuing misuses and breaches. Organizations increasingly recognize the risks involved in securing and managing personal data, and governments are implementing strict legislation in this area.
The coronavirus outbreak has demonstrated the important role of digital ethics in how governments and healthcare organizations are using technology and personal data to address the pandemic. However, no matter how urgent the response to the crisis is, decisions about how technology and data are used could result in more harm than good if those decisions are not grounded in digital ethics. The pandemic has shown that regardless of the hype around digital ethics, many organizations are still not applying them. And, as a result, the innovation hasn’t yet passed the Peak of Inflated Expectations.

Board members and other executives are sharing their concerns about the unintended consequences that the innovative use of technology can have. There is frequent, high-profile press coverage of stories that concern the impact of data and technology on business and society more broadly. More universities across the globe are adding digital ethics courses including the University of Oxford and the University Melbourne that recently launched programs and centers to address ethical, policy and legal challenges posed by new technologies. Government commissions and industry consortiums are actively developing guidelines for ethical use of AI. See “How Forthcoming EU Legal Framework Will Affect Your AI Initiatives.”

**User Advice:** Business value and digital ethics need not be in conflict. Intention is key. If the only goal is business performance, and ethics is seen only as a way of achieving this goal, this may lead to window dressing. However, if the goal is to be an ethical company, and this leads to better business performance, then this serves all parties, and society more broadly. It will only strengthen the organization, helping you to have an even greater positive influence in the future.

Business and IT leaders responsible for digital transformation in their organizations should:

- Identify specific digital ethics issues, and opportunities to turn awareness into action throughout the various business domains.

- Discuss ethical dilemmas from different points of moral reasoning, such as outcome determinative versus empathy-focused. Ensure that the ethical consequences have been accounted for and that you are comfortable defending the use of that technology, including unintended negative outcomes.

- Elevate the conversation by focusing on digital ethics as a source of business value, rather than simply focusing on compliance and risk. Link digital ethics to concrete business performance metrics.

**Business Impact:** There are ethical consequences that arise through the use of digital technology in every business domain. Digital ethics should be treated as a tangible business practice discipline rather than an academic discussion. It does not have to be at odds with optimizing business performance. In fact, ethical behavior can have business value in itself.

Areas of business impact include influencing innovation ideas, product development, customer engagement, corporate strategy and go-to-market.
Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Sample Vendors: Avanade; Hypergiant; IBM; Microsoft; Salesforce; SAP; SAS

Recommended Reading: “Data Ethics and COVID-19: Making the Right Decisions for Data Collection, Use and Sharing”

“Digital Ethics: What Every Executive Leader Should Know”


“Top 10 Strategic Technology Trends for 2020”

“The CIO’s Guide to Digital Ethics: Leading Your Enterprise in a Digital Society”

“Data Ethics Enables Business Value”

“Use Privacy to Build Trust and Personalize Customer Experiences”

API-Based Digital Commerce

Analysis By: Mike Lowndes

Definition: API-based or, as more commonly used in the market, “headless” digital commerce is the provision of digital commerce functionality via APIs, to decouple presentation from business logic and to integrate commerce capabilities within any context where selling is required.

Position and Adoption Speed Justification: API-based digital commerce is being rapidly adopted by midsize to large digitally mature organizations. Such adoption is driven by:

- Recognition of the quality of digital experience as a key differentiator across multiple touchpoints (e.g., native mobile apps, marketplaces, social platforms, in-store experiences, IoT and wearables, smart homes and vehicles).

- Emergence of the progressive web application (PWA) as the dominant “next generation” of client-side presentation.

- Emergence of digital experience platforms (DXPs) in supporting “experience-driven commerce.”

- Commerce as an enabling part of a wider digital business technology platform.

- Pace of innovation in digital commerce requiring more flexible, modular architectures.

- Expense and complexity of some leading “monolithic” commerce platforms, when a subset of more agile capability is desired.
The proliferation of touchpoints requires a multiexperience approach to applications. This requires the decoupling of the presentation from logic and data that an API-based approach offers. Some vendors (e.g., commercetools and Elastic Path) provide pure-play API-based commerce platforms, while others (e.g., Spryker) retain a native storefront but also provide full APIs for headless operation known as head optional or hybrid headless.

Most vendors’ own native commerce platform storefronts are now shifting away from server-side “themes” or template engines toward being SPA or PWA. In this case, the platform customer may not use the API (or even know of its existence) but it nevertheless powers the native storefront. Interest in this approach is just over the Peak of Inflated Expectations as some of the complexity of this approach is being realized.

Commerce experiences built on API-based platforms can be more complex to manage than single-vendor “full stack” solutions. There is limited customer uptake in the SMB and lower midmarket commoditized digital commerce space. A key challenge when using commerce platforms completely “headless” is the integration with a fully decoupled storefront or other presentation layer. This adds complexity to implementations and can impact business user interfaces and usability of the overall system. Headless vendors are addressing this by providing reference storefronts via popular JavaScript frameworks, and ensuring business users retain control over the storefront.

**User Advice:** API-based commerce may fit your requirements if you:

- Want to retain granular control over multiexperiences, including deploying a SPA/PWA presentation tier.
- Already have or are looking to implement a DXP to provide a more consistent customer experience across commerce, brand and other digital properties.
- Have a large inflexible legacy monolithic, full-stack commerce application that cannot be replaced in a single step, and desire to migrate to a modular architecture.
- Are looking to support multiple digital and physical channels equally from the same business logic, and support cross-channel continuity of experience.
- Have a unique commerce business model that full-stack vendors cannot support without considerable customization.
- Need commerce integrations to support wider digital business strategies.

For more on the considerations around implementing an API-based platform, see “Innovation Insight for API-Based Digital Commerce.”

**Business Impact:** API-based commerce is featured in the “2019 Strategic Roadmap for Digital Commerce,” and will be critical for the future of “commerce to you (C2U)” (see "Industry Vision: Want to retain granular control over multiexperiences, including deploying a SPA/PWA presentation tier."

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Commerce to You”), whereby commerce functions occur in the customer’s context wherever and using whatever channels are most convenient to them. Commerce journeys will become multiexperience and an API-based approach is a fundamental enabler for such experiences.

API-based commerce says nothing about the architecture underlying the API(s). Most digital commerce platform vendors are now providing robust APIs for “headless” use cases but are not all API-based. The API is often a “bolt on” to an existing traditional monolithic architecture. An API-based platform starts with the API as the primary interface and the commerce application is built to support it. These platforms can be made available as a set of discrete capabilities that can be utilized independently. As such, these capabilities may no longer require a “whole platform” purchase or subscription. Some vendors approach this modular set of packaged business capabilities, while other vendors remain platform-focused. API-based commerce is therefore a step toward and an enabler of composable commerce.

**Benefit Rating:** Transformational

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** commercetools; Digital Goodie; Elastic Path; Skava; Spryker; Storm Commerce

**Recommended Reading:** “Apply the Principles Behind the Future of Applications to Digital Commerce”

“Magic Quadrant for Digital Commerce”

“Align Your Approach to the Emerging Digital Commerce Platform Landscape to Make Buy or Buy-and-Build Decisions”

“Harness the Core Capabilities of a Digital Commerce Platform”

“Innovation Insight for API-Based Digital Commerce”

“Industry Vision: Commerce to You”

**Sliding Into the Trough**

**Privacy by Design**

**Analysis By:** Bart Willemsen; Nader Henein

**Definition:** Privacy by Design (PbD) is a set of privacy principles which are mandatory in certain jurisdictions including Europe and Canada. PbD is about protecting privacy proactively by embedding it often and early in technology (e.g., application or customer interaction design), as well as into procedures and processes (through, for example, privacy impact assessments). There
is no commonly agreed-upon definition of PbD, though one of the more widely used definitions is that from the Information and Privacy Commissioner (IPC) of Ontario, Canada.

**Position and Adoption Speed Justification:** Privacy by Design is not a new concept. The term was introduced in the 1990s, but widespread recognition beyond privacy professionals only came when the IPC of Ontario described seven key elements: proactivity, privacy by default, privacy embedded into design, full functionality, end-to-end security, visibility and transparency, and user centricity (see IPC publication “Privacy by Design. The 7 Foundational Principles”).

In the U.S., a report by the Federal Trade Commission (FTC) from 2012 (“FTC Issues Final Commission Report on Protecting Consumer Privacy”) is the most visible initial support for the PbD principle. Regulatory guidance is expected to be published from time to time.

The EU’s General Data Protection Regulation (GDPR) of 2018 requires “data protection by design and by default,” implying a PbD approach to all processing of personal data. Privacy professionals and product vendors have since intensified the debate as to how PbD is best implemented, justifying a position postpeak. With time it is expected that precedent shaping rulings will bring further insight. Meanwhile, vendors have added statements in their go-to-market approach like “the products are designed with PbD in mind,” though sometimes with little reference material to support the claim. Ultimately, as privacy preserving capabilities become a more organic part of the development and architecture process, the need for PbD increases as does the benefit rating.

**User Advice:** Tackle privacy by design in manageable steps, a wholesale shift will be too much to handle. Privacy by Design is a cultural change about the processing of personal data. This pertains both to existing operations and to innovations. Through business process reengineering, existing operations may be adjusted. Especially in innovative developments and new processes, the change begins by asking questions such as:

- Can we achieve the purpose set out by using less personal data?
- Can we end the personal data life cycle earlier?
- Can we provide the same functionality or customer experience without using the identifiable data?
- Does the customer understand what we are processing about them and why?
- Can we adequately protect what we process?

Apply PbD principles first when developing information architecture for personal data from the ground up, but also when evolving and maintaining an existing processing activity (ultimately applying PbD at the company level). Gartner provides a primer in addition to the seven foundational principles (see “Build for Privacy”).
Systems should be designed so that the collection of potentially privacy-sensitive data is transparent to the data subject. Some technology-focused ideas for implementing PbD are reduction in amounts of personal data and retention (data minimization); working on the original data (rather than copies); and applying pseudonymization where possible, alongside adequate authorization and access controls. Evaluate the risks of reidentification and traceability, and include data location in your considerations. Moreover, implementing PbD can result in organizational and procedural changes such as designating a privacy officer with reach, procurement activities for new IT services or frequently conducting privacy impact assessments.

Expect consumers, employees and citizens, as well as new privacy laws, to pick up the idea of PbD, and assess the necessity of applicability to your organization. Change your development and maintenance processes to include reviews of the privacy design.

**Business Impact:** Today, privacy is where security was a decade ago: bolted on, rather than built in from the beginning. Experience from security professionals tells us that fixing issues after the development of a product is many times more expensive than getting it right from the start. The same applies to privacy controls. When such controls are built in from the very beginning, they can assist and enable consumer trust, help to prevent violations of privacy rights (such as costly data breaches) before they occur, and reduce their damage if they do (such as fines or brand damage). This is particularly relevant in the context of the Internet of Things. As so many new things are designed, now is the right time to design them from the ground up with privacy and the protection of any personal data in mind.

**Benefit Rating:** Moderate

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Emerging

**Recommended Reading:**

“Use a Privacy Impact Assessment to Ensure Baseline Privacy Criteria”

“Be Resilient: Prepare to Treat Cyber Risk Following the Coronavirus (COVID-19) Outbreak by Focusing on These 7 Areas”

“Preserve Privacy When Initiating Your IoT Strategy”

**Conversational AI Platforms for Commerce**

**Analysis By:** Mike Lowndes

**Definition:** Conversational AI platforms for digital commerce utilize natural language interfaces such as voice and text chat, including messaging platforms, to enable people (and machines) to discover and purchase goods and services via a dialogue. This innovation profile name has changed from “Conversational Commerce” to reflect the wider use of that term to include “web chat” and human-mediated buying conversations.
Position and Adoption Speed Justification: Conversational AI platforms in digital commerce provide a new UI to commerce software, that of conversational dialogue. The maturity of this technology remains low. The "Conversational Commerce" hype initially peaked in 2017 and has since faded due to the mixed success of first generation solutions. Development is nevertheless being propelled by the acceptance of conversational interfaces and major industry players are piloting or developing broad conversational systems. Innovation is driven by improvements in:

- Natural language processing (NLP),
- Natural language generation (NLG),
- Semantic technology (knowledge graphs and ontologies required to understand a product domain and link it to customer — behavior),
- Statistical algorithms,
- Deep learning trained on vast amounts of data.

However, text or voice only UIs are limiting for product discovery journeys. "A picture is worth a thousand words" and product display and grids remain a critical part of digital commerce customer journeys. Conversational digital commerce will be multimodal. In simple use cases such as service/food ordering and repurchase of known items, conversational digital commerce user journeys already work well, e.g., via social messaging platforms, and are being widely accepted via home devices and mobile apps. However, solutions for more complex product discovery journeys via conversations remain rare.

User Advice: Platforms that enable conversational digital commerce are emerging (e.g., Mmuze, Inbenta). Search engines are gaining intent detection capabilities and refining product discovery, but are usually query-response, not capable of dialogue. Gartner feels that it will be some time before search, semantic networks (graphs), dialogue management and chatbot technologies converge to reach the maturity required to be a cohesive end-to-end product discovery dialogues for customers. Major breakthroughs in conversation handling remain before this will become mainstream in retail product discovery journeys.

IT leaders investigating conversational platforms for commerce should:

- Understand the opportunities and limitations of the current technology to determine whether it can support your commerce ambitions.
- Investigate using it now for simple digital commerce use cases such as repurchase, or limited ordering: clearly communicate the limitations to your customers to avoid frustration.
- Challenge vendors to solve today's problems in order to widen the application of conversational commerce.
- Maintain control of semantic models (representing product catalogues and customer interactions with them) when working with vendors.

- Ensure to decouple training data from underlying learning engines as the conversational AI marketplace consolidates over the next three to five years.

- Use a mixture of interactive design elements (forms, buttons) along with AI inside conversations — resist trying to do everything with natural language: use multimodal interfaces.

**Business Impact:** Digital commerce will be available when and where your customers are in their journey via the technology they interact with daily (see “Industry Vision: Commerce to You”), including:

- Messaging platforms
- Smartphones and wearables
- Voice-driven smart home devices (Google Home Hub, Amazon Echo Show, etc.)
- Connected vehicles

Digital commerce interactions via these customer-owned devices are using the embedded natural language interfaces: those of messaging apps and voice. Thus, dialogues will be hosted by these devices, not by seller's platforms. We've reached a tipping point where the utility of conversational systems have exceeded the friction of using them for many simple tasks. However, humans are fundamentally visual creatures and product discovery will continue to be multimodal (e.g., voice and vision) for many use cases. This will have an impact across businesses, especially on marketing, sales and support processes and technology.

**Benefit Rating:** Transformational

**Market Penetration:** 1% to 5% of target audience

**Maturity:** Emerging

**Sample Vendors:** Amazon; Apttus; Facebook; Google; Inbenta; Microsoft; Mmuze; SAP

**Recommended Reading:** “Conversational AI to Shake Up Your Technical and Business Worlds”

“Innovation Insight for Conversational Commerce”

“Cool Vendors in AI for Conversational Platforms, 2017”

“Conversational Commerce Is an Emerging Strategic Retail Channel for Building Customer Loyalty”

“Industry Vision: Commerce to You”
“IoT-Based Thing Commerce Requires a Differentiated Customer Experience”

Customer Service Analytics

Analysis By: Steve Blood; David Norrie

Definition: Customer service analytics is the combination of interaction analytics (desktop, speech and text), customer journey analytics and next best action analytics that collectively surface real-time and historical insight into the customer service experience. Analysis and outcomes leverage and enable organizations to make improvements to customer experience, employee experience or business process.

Position and Adoption Speed Justification: Customer service analytics is a core capability of Knowledge & Insight, one of the four pillars of great customer service (see “Customer Service and Support Technology Primer for 2019”). Customer service analytics is also evolving — what started out as discrete desktop, speech and text analytics; capabilities to understand and improve on customer service operations through mining of phone calls, emails and messages as well as analyzing advisor desktop actions, is becoming a more integrated part of a strategy for analyzing customer experience. From a maturity perspective, text analytics is more readily available but many of the initial challenges with mining telephone recordings are being resolved with improved quality of categorization of conversations using artificial intelligence and the use of machine learning is improving overall accuracy. Coupled with sentiment and emotional analysis, organizations are more readily able to surface insights into customer experience. As interest in customer analytics grows, providers of previously siloed, best-of-breed capabilities are extending their products into adjacent areas increasing the potential to offer a customer service analytics suite, composed of interaction analytics, customer journey analytics and next best action. While a single suite capability is not yet available in market, the opportunity to select analytics providers that can offer a solution for multiple customer service analytics use cases (e.g., voice of the customer, employee coaching, next best action, fraud detection, loyalty prediction) will offer the potential to better manage the operating costs of offering analytics.

User Advice: Calculate the potential added value of this integrated analytical technology suite above and beyond siloed technologies, such as speech analytics or performance management. Pay particular attention to the technical architecture and ensure alignment with the organization’s overall customer analytics strategy. Broaden the value proposition by identifying LOBs outside of customer service and support such as marketing and HR.

Business Impact: Deployment in a customer service center may uncover a diverse range of insights that can be used to improve the performance of the operation and its advisors, including customer and departmental insights (such as customer perceptions of a marketing campaign or a new product pricing strategy). The challenge is in building the business case, because often the insights (and, therefore, the ROI potential) won’t be revealed until the investment has been made. Identifying specific use cases and mapping these to existing case studies can help scope out the potential benefit.
Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Sample Vendors: CallMiner; Clarabridge; Genesys; Medallia; NICE; OpenText; Verint

Recommended Reading: “The Future of Customer Service Analytics”
“How to Use AI to Improve the Customer Experience”
“How to Drive Value From Customer Experience Analytics”
“How to Choose Your Best-Fit Vendor for Speech Analytics in Customer Service”
“How to Choose Your Best-Fit Vendor for Speech Analytics in Customer Service”

Shoppable Media

Analysis By: Anna Maria Virzi

Definition: Shoppable media refers to videos, images and other interactive media formats that trigger a transaction via an integrated handoff to a commerce site when a user selects an object representing showcased merchandise. Object examples include a button on an image, or video of a dress or gadget. Various digital shoppable media formats are available and viewable via both mobile and desktop — with notable momentum in social media apps.

Position and Adoption Speed Justification: Consumers expect to shop and buy when and how they want, seeking an engaging and seamless buying experience. Shoppable media is a merchandising technique designed to empower brands to present their offerings at the moment of desire, closing sales without friction in a customer's current context. For example, if a consumer sees a dress on Instagram they'd like to buy, they could click on it through the app rather than having to switch to a retailer app or alternative channel.

Brands see shoppable media as a way to drive consumers further down the funnel than awareness media. The consumer experience with shoppable media, however, is damaged in instances where retailers slap a “buy” button on images and force shoppers to click through multiple steps to complete a transaction. In addition, some retailers prioritize mobile and website features, such as geolocation product availability on product pages, over shoppable media. This represents one way that marketers are making hard choices about their marketing investments — and shoppable advertising is losing out for now. According to Gartner’s 2019 Marketing Technology Survey, 18% of business-to-consumer (B2C) respondents in North America and the U.K. anticipated shoppable media will be one of three emerging technologies to have a major impact on marketing programs within five years. That's down from 30% in 2018, indicating that marketing leaders do not appear to be convinced of shoppable media's value.
Nonetheless, social media sites are building out shoppable media capabilities designed to win over advertisers. Pinterest, for example, offers Shop the Look ads and shoppable Product Pins through its catalog feature. In mid-2020, Pinterest teamed up with Shopify so Shopify's merchants can upload catalogs to the platform and turn their products into shoppable Pins. Snapchat has shoppable augmented reality ads and has a partnership with Shopify to launch in-app stores for select accounts. Facebook's Instagram offers a check-out feature on a product image; shoppers can add an item to their “bag” and then are taken to a second screen to enter payment information. Facebook, in mid-2020, said it was running a pilot with a limited number of businesses on Facebook. TikTok tested shoppable videos beginning in late 2019.

Another form of shoppable media — shoppable TV — sees continued interest but suffers from complexity in both consumer usability and value chain. In 2019, NBCUniversal launched shoppable TV ads that enabled linear TV viewers to make purchases. NBCU displays an on-screen QR code within the ad. Users can scan the QR code with their mobile phone and then be taken to an e-commerce site to buy the featured product. In 2020, NBCU launched NBCUniversal Checkout, adding shoppable brand content and shoppable editorial content to their advertising offerings.

Last year, we estimated that 20% to 50% of the target audience had adopted shoppable media. In 2020, we have revised the estimated adoption rate to between 5% and 20%. Our conversations with digital marketers indicate that many remain heavily invested in search and social advertising, and others are testing other tactics, such as over-the-top advertising.

User Advice: Digital marketing leaders in retail and from consumer brands, such as fashion and home furnishings, would benefit from a shoppable media strategy. They should:

- Evaluate shoppable ads and social media posts as well as enriched content marketing efforts to extend storefronts across web, social and mobile app platforms, which may be more critical than ever as physical stores could see continued restrictions due to COVID-19.
- Invest in visually compelling content, being mindful your content competes with professional and consumer-generated content.
- Monitor the environment where the shoppable content appears, ensuring digital experiences live up to customer expectations.
- Be prepared for capabilities, especially shoppable TV, to evolve.

Business Impact: Marketers either already have embraced these formats or will bypass them altogether unless the technology becomes easier to use for merchants and consumers alike. Those who decide to adopt shoppable media formats need to develop engaging, content-driven experiences for targeted audiences and presented in a convenient digital context to:

- Attract new customers through creative, shareworthy discovery vehicles
- Encourage upsell and cross-sell of outfits, sets or use cases for increased average order value
- Enable high-margin, data-rich, direct brand-to-consumer sales relationships
- Counteract the commoditizing effects of online price competition and side-by-side comparisons
- Provide near-real-time insights on the most compelling creative and messaging to be used in other nonshoppable contexts

**Benefit Rating:** High

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Amplience; Curalate; Facebook (Instagram); LoopMe; Monotype Imaging (Olapic); Pinterest

**Recommended Reading:** “Rightsizing Social Investments”

“Keeping Up With Channel Sprawl in Younger Consumers’ Path to Purchase”

“L2 Intelligence: Social Platforms and Influencers, Commerce”

**Customer Data Platforms**

**Analysis By:** Joseph Enever

**Definition:** A customer data platform is a marketing system that unifies a company’s customer data from marketing and other channels to enable customer modeling, and optimize the timing and targeting of messages and offers.

**Position and Adoption Speed Justification:** Marketers continue to have high expectations for CDPs, and options available are increasing in number, leading to further fragmentation of the crowded market and more complex decisions for prospective clients. Organizations using a number of different technologies and customer data silos to design, orchestrate and optimize multichannel marketing campaigns have driven much of the category demand. Gartner predicts that by 2023, 70% of independent CDP vendors will be acquired by larger marketing technology vendors or will diversify through M&A of their own to enter adjacent categories such as personalization, multichannel marketing, consent management, and/or MDM for customer data.

The slowed movement through the Hype Cycle caused by the continued variability in vendor capabilities sees it placed at the threshold between the Peak of Inflated Expectations and the Trough of Disillusionment.

The maturing marketplace is varied and crowded with a multitude of CDP “types” including “marketing data integration,” “smart hubs” and “marketing cloud,” which signals movement toward market consolidation and settlement. There is overlap in purpose between “types,” but use cases
vary, for example, “marketing data integration” CDP’s focusing on data management and integration, and “smart hub” CDP’s covering broader scope including marketing orchestration.

**User Advice:** Marketer demand for unified customer data is steady, as is interest in CDPs, but teams often struggle to formulate the use cases which underpin their desired marketing outcomes. Top overcome this challenge, unite stakeholders to brainstorm and categorize use cases for unified customer data. Identify points of friction and opportunity within customer data operations, customer analytics operations, marketing personalization and the customer experience.

Evaluate your use cases to help determine whether to build or buy. If buying, assess the capabilities of a CDP vendor against your use cases. Work backward and identify the CDP features required to fulfill your use cases as well as any other technologies required to fill adjacent needs.

Carefully examine the potential for overlapping capabilities with adjacent technologies (e.g., personalization engines and multichannel marketing hubs, and governance technologies such as consent and preference management or master data management) to prevent redundancies or gaps in your technology stack.

Evaluate each vendor’s offering with an eye toward martech stack integration, identity resolution, customer analytics and the skill sets required to deploy and use the software. Seek client references to validate the trustworthiness of their offering, as well as the usability and effectiveness of the offering against similar use cases.

Inquire with your existing vendors about whether they have generally-available offerings akin to a customer data platform, or a plan to introduce one.

**Business Impact:** As marketers continue to place increased value on customer data modeling and personalization initiatives, the challenge to unify and manage customer data remains. The CDP helps marketers integrate, unify, segment and activate their first-party data.

For midsize enterprises and individual business units, CDPs have the potential to become a system of record, transforming marketers’ ability to deliver consistent, targeted, contextually-relevant experiences across channels. However, in many cases it will act alongside enterprise databases as a conduit for data to power multichannel marketing use cases.

**Benefit Rating:** Moderate

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Acquia (AgilOne); Adobe; Arm (Treasure Data); BlueConic; BlueVenn; Leadspace; Lytics; Optimove; Simon Data

**Recommended Reading:** “Market Guide for Customer Data Platforms”
Progressive Web Apps

Analysis By: Jason Wong

Definition: Progressive web apps (PWAs) are designed to deliver an applike experience without the need to install app binaries on devices. They combine an app shell with service workers installed on desktop or mobile devices, which enable HTML5, JavaScript, Cascading Style Sheets and web content to be cached and synchronized for optimal performance. When users opt to enable them, PWAs deliver applike features such as offline data access, push notifications and a home screen icon.

Position and Adoption Speed Justification: Having only been introduced in 2014, PWAs are the future of desktop and mobile web experiences. All leading desktop and mobile browsers have embraced advances originally introduced by Google, Facebook, Mozilla and others. Browsers such as Google Chrome, Microsoft Edge, Mozilla Firefox and Apple Safari enable developers to implement service workers (albeit not consistently across browsers and operating systems), so that websites can behave like apps. Service workers are embedded within the browser to surface PWA functions, such as the installation of a website as an app icon on the home screen with an app shell. The installation can be done directly from a PWA-enabled website and can be shared through links and QR codes. Microsoft allows PWAs to be listed on, and deployed through, Microsoft Store; Google has also done the same for PWAs on Google Play.

Although PWAs are gaining momentum, such as use in multiexperience development platforms and digital commerce platforms, PWAs are headed toward the Trough of Disillusionment. This is due to the still fragmented user experience across browsers, fairly basic app capabilities and, unlike mobile apps, a general lack of consumer awareness of the term. Also, Apple continues to take an “arm's-length” approach to supporting PWAs and uses the term “HTML5 apps” to describe them instead.

User Advice: Application leaders should:

■ Inventory their organization’s mobile apps and evaluate which can be reproduced simply using PWAs, based on UI and functional feature requirements.

■ Evaluate PWAs for employee-facing app use cases, such as extending intranet and employee portal functionality to a mobile-optimized interface.

■ Investigate the potential security limitations of PWAs in terms of securing data cached locally on devices that use default web security and encryption technologies, such as HTTPS.
Use PWAs in digital commerce as a means of turning web users into mobile-first users by increasing engagement and conversion rates with high-value, frequent interactions.

**Business Impact:** There are two main benefits for businesses. First, users do not need to visit an app store and install an app in order to get the capabilities of PWAs (although PWAs can be displayed in the Microsoft Store and Google Play). Second, PWAs can be changed and updated without the requirements to push revisions to an app store and force updates on users’ devices.

PWAs offer fewer capabilities than native apps, but they can be achieved at a fraction of the cost associated with native app development. What is more, they can be delivered quickly and with existing web development skills and teams.

In the long run, moving to PWAs, in place of dedicated native apps, is likely to reduce platform-specific maintenance costs for mobile apps in particular. In the short term though, fragmentation of the PWA experience across different browsers may lead to adoption challenges, as may fragmentation of support by web development tools and frameworks.

**Benefit Rating:** Moderate

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Adobe (Magento Commerce); Apple; Elastic Path; Google; Ionic; Lumavate; Microsoft; Mobify; Moovweb

**Recommended Reading:**
- “Key Considerations When Building Web, Native or Hybrid Mobile Apps”
- “How Progressive Web Apps Improve Digital Commerce Experience”
- “Assessing Progressive Web Apps: Installable, Offline and Notification-Capable”

**Voice-of-the-Customer Solutions**

**Analysis By:** Jim Davies

**Definition:** Voice of the customer (VoC) solutions combine multiple, traditionally siloed technologies associated with the capture, storage and analysis of direct, indirect and inferred customer feedback. Technologies such as surveying, social media monitoring, text and speech analytics, and customer journey analytics are integrated to provide a holistic view of the customer’s “voice.” The resultant customer insights are acted on by disseminating relevant information to the right employees at the right time via the right channel.

**Position and Adoption Speed Justification:** Most organizations have multiple and often quite mature customer feedback mechanisms, but these are usually departmentally oriented and siloed in nature, and are often not used for strategic purposes. The most common mechanism is
surveying, but departments are also increasingly becoming transfixed on capturing and understanding additional customer feedback associated with their specific domains. They are doing so through the use of speech analytics in the contact center, web analytics on the corporate website, and social media monitoring by marketing to capture customer comments. However, these pockets of feedback for the large part remain isolated — few organizations have aligned these various sources to create an integrated VoC hub.

Most organizations aspire to tie these diverse feedback channels together to create a single view, but are currently a few years away from achieving this. Instead, for the majority, the current drive is to improve surveying through investment in a new platform, which can then form the basis of a VoC hub in years to come.

Some momentum has been seen within leading customer-centric organizations, particularly those in consumer-centric industries such as financial services, telecommunications and utilities. But VoC is far from mainstream. The vendor landscape is still emerging, and there are over 20 vendors that have expertise spanning the diversity of feedback collection techniques that a holistic VoC solution encompasses. However, multivendor VoC solution ecosystems — where data is imported into a central solution from one or more third-party solutions — will be the unavoidable organizational deployment strategy for the next few years.

**User Advice:** Ideally, VoC should fall under the remit of a central customer experience function; however, in its absence, find an owner with cross-department awareness and set up a cross-department VoC committee. Then do the following:

- Conduct an internal audit to assess current capabilities and reduce duplicate departmental customer feedback technologies (such as surveying or social media monitoring).
- Prioritize future initiatives to collect VoC data based on the richness of the content. Strive to obtain a single, holistic view of the VoC.
- Determine the most appropriate data architecture and analytical models/techniques to extract key customer insights at both individual and aggregate levels.
- Distribute relevant insights/actions across the organization (front line and management) in a timely manner using workflow and operational integration.
- Determine what distilled set of feedback metadata (for example, a customer sentiment score) will be fed into the corporate master data management environment.
- Leverage VoC in core business processes, ideally in real time — for example, using a low survey score to open a case within the CRM system.

**Business Impact:** The business impacts of VoC are many and varied. Sources of VoC data are plentiful, ranging from survey results to social media dialogue. Such sources provide valuable
venues for analysis, but analytics in isolation inherently limits the opportunity to fully understand customers.

By integrating data from multiple VoC sources, organizations can uncover subtler insights, drive accuracy and ultimately instill more confidence in the actions taken at individual customer (such as an outbound call) as well as overarching strategic (such as a process change) levels. This holistic approach also ensures that the right insight gets to the right employees at the right time. For example:

- A new lead resulting from a tweet being sent to a sales rep.
- Negative campaign feedback from analyzing a recording of a contact center dialogue being sent to a marketing manager.
- A survey comment to “talk slower” being sent to an agent.

VoC can be used to help manage brand perceptions, understand the customer experience and develop future customer engagement strategies.

**Benefit Rating:** High

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Clarabridge; Confirmit; InMoment (MaritzCX); Medallia; NICE; Questback; SAP (Qualtrics); SMG; Verint Systems

**Recommended Reading:** "Market Guide for Voice-of-the-Customer Applications"

"Managing the Customer Service Experience"

**Personalization Engines**

**Analysis By:** Jennifer Polk

**Definition:** Personalization engines apply context about individual users and their circumstances to select, tailor and deliver messaging such as content, offers and other interactions through digital channels in support of three use cases: marketing, digital commerce and customer experience. Personalization engines are most commonly used to improve conversion, average order value, campaign performance or revenue.

**Position and Adoption Speed Justification:** As personalization engines slide through the trough, Gartner’s 2019 Marketing Technology Survey shows a significant rate of deployment — 64% of marketing leaders surveyed had deployed or were deploying a personalization platform. But we also see the risk to fledgling personalization projects in the 18% had plans to deploy the solution...
within the next two years, 66% of whom had yet to get funding. In a recessionary environment, marketing leaders may struggle to secure or sustain budget for personalization, particularly discrete investment in additional tools or talent. While 57% of marketers who have invested in a personalization engine cite a noticeable increase in total revenue, 27% of users are measuring success in terms of campaign performance. While meaningful, improved campaign performance may be insufficient to justify continued investment in personalization, much less the talent, training, data collection and integration to effectively use a personalization engine. Personalization engine adoption, utility — and perhaps more importantly — results that can push this technology toward greater productivity, hinges on having:

- A personalization strategy, business objectives and a prioritized roadmap of projects and tests
- Trained teams using the tool for segmentation and testing, modifying content and adapting message delivery
- Data collection — balanced with data ethics — and integration

User Advice: Personalization engine providers often compete against marketing point solutions, multichannel marketing hubs and customer data platforms. But personalization engines offer a discrete ability to accelerate segmentation, experience testing and optimization, message targeting and triggering across channels, touchpoints and use cases. Use cases range from targeted web content to more relevant email marketing campaigns, from personalized product recommendations based on real-time, local inventory to optimized online and offline customer experiences.

Before pursuing personalization and investing in a personalization engine, assess your team's ability to:

- Build a personalization strategy and roadmap of prioritized initiatives tied to customer and company goals
- Pilot personalization using existing resources (data, talent, technology, content) to prove results and justify budget
- Audit your martech stack for gaps in analytics, segmentation, testing and marketing automation to set tool requirements
- Identify and map sources of customer data, behavioral and contextual data and business intelligence data (e.g., inventory levels)
- Allocate staff to personalization project management, testing, content creation, channel management, campaign planning and execution
- Invest in training — the average user team includes 15 people each spending 18 hours in training — to increase personalization engine adoption and utilization
**Business Impact:** Personalization engines are commonly used by marketing, digital commerce, merchandising and customer experience teams to optimize content and campaigns; commerce experiences and recommendations; or interactions across customer touchpoints like call centers, chat and digital kiosks. Gartner’s 2019 Marketing Technology Survey showed a slightly higher rate of deployment of personalization engines among companies in high tech, IT and business service industries; however, these solutions can be utilized across sectors, company sizes and revenue models. Other sectors, like retail and financial services companies, have long used personalization engines to target product recommendations and promotional offers based on customer attributes, behavior, product and category affinity, and even likelihood to churn.

Consumer products companies are expanding their use of personalization engines as they embrace direct-to-consumer business models. Brands and retailers newer to personalization should look for solutions that enable data integration through open architecture, prebuilt connections into common data sources and self-service tools like data ingestion schemas, to build a foundation for testing and targeting, WYSIWYG editors for easier test set-up and content rendering, without reliance on developers. Teams looking to scale personalization should prioritize advanced functionality like multiarmed bandit testing and contextual bandit algorithms to generate additional customer insight, improve targeting and testing results.

B2B companies have been late adopters of personalization, but those who have invested in account-based marketing (ABM) and segmentation are better positioned to take advantage of personalization engines, having overcome cold start data challenges that often plague B2B. Those who have yet to embrace ABM can take advantage of personalization, but should pursue providers that offer the ability to target based on real-time and contextual data, such as reverse-IP targeting, in the absence of rich first-party customer data. Across maturity levels, companies should use personalized recommendation strategies to increase conversion, revenue per user and total revenue, while those focused on marketing use cases also find improved campaign performance.

**Benefit Rating:** High

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Adobe; Certona; Dynamic Yield; Emarsys; Evergage; Monetate; Qubit; RichRelevance; ZineOne

**Recommended Reading:** "Predicts 2020: Marketers, They’re Just Not That Into You"

"Building a High-Returns Marketing Personalization Strategy"

"Magic Quadrant for Personalization Engines"

"Critical Capabilities for Personalization Engines"
Virtual Customer Assistants

Analysis By: Brian Manusama

Definition: A virtual customer assistant (VCA) is an application that acts on behalf of an organization to engage, deliver information and/or act on behalf of a customer. It consists of five elements: a conversational customer facing user interface that receives and delivers inputs and outputs; a natural language processing engine; a dialogue manager; a search engine that traverses data repositories through enterprise integrations and machine learning capability.

Position and Adoption Speed Justification: The momentum shifted for VCAs in 2017 when the market exploded after Facebook announced it would be providing a bot framework for developers. Prior work by vendors like IBM Watson, Nuance, Verint Next-IT, IPsoft and Creative Virtual had, however, already raised a vast amount of interest in and awareness of virtual assistant (VA) technology as a practical tool to automate customer engagements. Today, although VCAs that support customer service are the most prevalent use case in the world for automation and self-service, the demand for supporting sales and marketing functions are rising.

The increased interest is based on heavily improved natural language processing technologies from 2017 onwards. Chat-centric mobile channels like messaging, which are designed to engage with customers and customer acceptance of robotic technology are the main drivers behind this rise in interest. Gartner survey tells us that 38% of U.K. and U.S. consumers are ready to shift to VCAs if they were as effective as human agents. The transition from reactive human-programmed virtual assistants that respond to questions with answers found in structured and unstructured content libraries, to proactive, sometimes machine-learned VCAs that look at the characteristics of individuals and act on their behalf is underway.

Current generation of VCA deployments and other types of conversational agents are often not done correctly. Many won’t reach the required confidence level needed to ensure customer satisfaction and engagement because incorporating domain-specific content into the model is a challenge. Simply put, these conversational agents cannot capture customer intent or handle unexpected input elegantly. With new, emerging practices from current deployments, a solid foundation of experiences needs to be built first to take full advantage of the capabilities. Successful implementations have required considerable effort from subject-matter experts.

Virtual customer assistants differ from chatbots as they require more infrastructure, have memory, and form a relationship with customers. Chatbots, on the other hand, are often narrow-cast applications that perform a limited set of tasks such as providing answers to FAQ.
The market for VCA is working its way through the Trough of Disillusionment, on the different Gartner Hype Cycles, to become a productive platform. In 2018, many transaction-based VCAs deployments have hit a wall in regard to delivering value and experience. The market is awash with low-end VCAs and chatbots that deliver a poor user experience, create friction and do not deliver business benefits as the market is maturing. These VCAs will fail, creating a backlash against VCAs in general and create a more guarded buyer. Only the enterprise-grade VCAs that create a compelling user experience and delivery true material business value will survive.

The VCA will be the new starting point to support multiple digital engagement channels. It can be a moderator of a social community, a guide on your mobile device to purchase new fitness equipment or a chat agent to help you open a bank account.

**User Advice:** Application leaders should:

- Determine the current state and desired future state of your customer engagement platforms. What methods and resources do you use today?
- Compare a simple set of serial projects to a complex “big bang” project to meet all identified business needs.
- Find the greatest-frequency simple conversations that constitutes a complete call, and that can be easily automated with a low risk of customer dissatisfaction.
- Identify the next set of complete calls that, at a stretch, might be handled by technology working with humans in the loop who would take over the call if the technology detects an issue. For example, in the case of a knowledge deficit in the VCA, a troubling tone of voice from the customer, or clear signs that the customer is making all the right moves to be closed by a human.
- Leverage capabilities of partners in the market that can bring value to your chosen platform like domain expertise and/or language skills to avoid building everything from the ground up.

**Business Impact:** The VCA is a targeted, special-purpose VA for sales, customer service and digital commerce and has unique objectives. The business impact for VCAs is threefold.

They address the need to:

1. Meet expectations for customer support on web and mobile channels by offering a higher frequency of interactions (24/7 and instant chat availability).
2. Move engagements to less-expensive customer self-service channels with faster time to resolution (to reduce cost to serve).
3. Provide proactive advice and engagement (to build loyalty and customer satisfaction).
The effective use of a VCA allows organizations to scale the numbers of engagements they can handle, especially in the contact center. The use of a voice-enabled VCA in a kiosk or automated teller machine can alleviate the need for typed interventions, and it can help create an interesting interaction for nontraditional audiences.

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Early mainstream

Sample Vendors: Artificial Solutions; Creative Virtual; eGain; IBM Watson; Inbenta; IPsoft; Microsoft; Nuance; Verint Next IT; [24]7.ai

Recommended Reading: “Market Guide for Virtual Customer Assistants”

“Market Insight: How to Collaborate and Compete in the Emerging VPA, VCA, VEA and Chatbot Ecosystems”

“Seven Decision Points for Success With Virtual Customer Assistants”

“Four Best Practices for Implementing Extreme Customer Self-Service”

Climbing the Slope

Consumer Messaging Applications

Analysis By: Sandy Shen

Definition: Consumer messaging applications are chat apps that enable consumers to communicate among themselves or with an organization. Over the years, consumer messaging apps such as Facebook Messenger, LINE, WhatsApp and WeChat have developed tools to enable organizations to build user experience and better engage customers for wider business needs.

Position and Adoption Speed Justification: Consumer messaging applications have grown rapidly, with leading platforms reaching over one billion active users, and organizations find them effective channels to engage customers for a range of use cases that include marketing, customer service and digital commerce. Employees such as sales and customer service are increasingly using these platforms to conveniently stay in touch with customers and be more responsive. This inevitably leads to security concerns as most of these platforms don't offer enterprise-grade security protection.

These messaging platforms are offering a range of tools for organizations to fulfill more business needs. For example, WeChat offers in-app messaging, embedded browsers; miniprograms along with official accounts for customer-facing offerings. Facebook Messenger and WhatsApp offer business tools to enable organizations to create profiles, manage chats and set up shops for commerce. Sophisticated implementations allow traffic generation from the messaging app to
branded mobile apps where customers can pick up the conversation in the mobile app from where it is left off from the chat app. Except for commerce functions which are being piloted on most platforms, other functions have reached mainstream and are being adopted by most organizations for customer engagement.

User Advice: We recommend:

- Use consumer messaging applications to address the most common types of customer interactions such as account balance, order status, change notifications and customer service.
- When using messaging applications for commerce, limit the number of items in the shop and support the shop with marketing and advertising to make products more discoverable.
- Investigate the security practices of the underlying messaging platform and design mechanisms to fill the gap to comply with your organization's security policies. Acknowledge the fact that some messaging platforms don't offer enterprise-grade security and have employee usage policies about not sending sensitive information such as customer or pricing data over those platforms.
- Explore various tools offered by messaging platforms to balance security controls with customer experience.

Business Impact: Consumer messaging applications are most used for customer service, digital commerce, and sales and marketing for B2C businesses but can be used for B2B as well to support direct sales and channel partners. Integrate messaging applications into your overall CRM and content management strategies to offer seamless experience between channels. Organizations which successfully leverage messaging applications will broaden the reach to existing and potential customers, generate traffic to their direct-to-customer channels (e.g., commerce sites, mobile apps and retail stores) and improve customer satisfaction and loyalty.

Benefit Rating: Moderate

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Sample Vendors: Facebook; Kik; LINE; Snap; Tencent (WeChat); Twitter; Viber; WhatsApp

Recommended Reading: “Updating B2C Social Messaging Strategies to Resonate with Consumers During a Crisis”


Insight Engines

Analysis By: Stephen Emmott
Definition: Insight engines apply relevancy methods to discover, organize, describe and analyze data. This enables existing or synthesized information to be delivered interactively or proactively in the context of digital workers, customers or constituents at timely business moments.

Position and Adoption Speed Justification: The hype behind insight engines stems from the use of AI to reinvent enterprise search, enabling enterprises to shift from keyword- to entity-centric discovery and unlock patterns inside unstructured and structured data, sourced both internally and externally. This shift enables insight — accurate and deep understanding — needed for purposeful action by placing data in context to inform. Data must be extracted from myriad sources, enriched and indexed; user queries must be analyzed and interpreted; and the touchpoint used must align with the task at hand. This comes packaged at a foundational level but must be developed by vendors, partners, and/or clients at the domain and situational levels where vendors do not offer prebuilt applications tailored to select domains and situations, e.g., CRM. Vendors have extended their use of AI (especially machine learning and knowledge graphs), new products are entering the market, and both Google G Suite and Microsoft Office 365 now include insight engines in their cloud office. Yet, the majority of enterprises have yet to shift from enabling search to delivering insight, and application of insight engines to the many and varied use cases they have the potential to serve. As such, insight engines have moved through the Trough of Disillusionment and ascend the Slope of Enlightenment.

User Advice: Focus the purpose of insight engines on informing employees to deliver insight rather than searching for information. At the highest level of maturity, insight engines retrieve and synthesize facts, deliver these through other tools, and do so proactively. For instance, a chat with a bot through Microsoft Teams or Slack can be powered by an insight engine that delivers answers as snippets from documents. More typical is a traditional search page with enhancements to guide the user using (1) autosuggest or autocomplete, (2) structured results with relevant facets to allow refinement, and (3) recommendations. Moving from the latter toward the former requires clarity of purpose and discrete application of the underlying insight engine. The beneficiaries of insight — people — must be placed at the center of the initiative: personify them, identify their use cases, the applications they use to conduct work, and the sources of content and data they need to draw information from. Then, relate these back to specific business outcomes and their measures.

With most enterprises using or contemplating cloud office, many application leaders will find their cloud office includes an insight engine — Microsoft Search (in the case of Office 365) or Google Cloud Search (in the case of G Suite). These products are deeply embedded and demonstrate what is possible with a focus on collaboration and sharing. Breadth and depth of capabilities can be obtained by looking at other insight engine vendors, with customer use cases and case studies exemplifying what is possible. See “Magic Quadrant for Insight Engines” for more information.

Enterprises have one or more cloud offices, multiple search engines operating, and search and insight capabilities within CRM, ITSM, and other categories of their application portfolio. An essential step therefore is reviewing how these various search and insight engines perform and interrelate. Deciding the right portfolio of insight engines, configuring these, and enabling users to
profit from them is key to ensuring insight can be facilitated across the foundational, domain and situational levels of the enterprise.

**Business Impact:** The principal impact of insight engines is on an organization's digital workplace and its capability to elevate the digital dexterity of its employees. They impact all functional domains across all industries, but are most impactful when utilized as a platform upon which to develop applications aligned with specific domains and situations. For example, proactively informing customer support agents in the context of a CRM. Such localization improves digital dexterity by enabling employees to better orient themselves to decide/act, acquire knowledge and collaborate.

A lesser-known but significant impact of insight engines is in terms of supporting automation. Insight engines can be integrated with other software such as RPA, to support the automation of various workflows relating to content, e.g., claims processing in insurance. Insight engines also have a role to play in support of digital experiences provided to external constituents, such as customer and suppliers, in the form of self-help knowledge bases, decision support, retrieval of content assets, etc.

Given these impacts, the semantic models and knowledge representation underlying insight engines and other applications will increasingly be a foundation for enterprises’ natural language ambitions.

**Benefit Rating:** High

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Coveo; Funnelback; Google; IBM; IntraFind; Lucidworks; Micro Focus; Microsoft; Mindbreeze; Sinequa

**Recommended Reading:** "Magic Quadrant for Insight Engines"

"Critical Capabilities for Insight Engines"

**Digital Wallet**

**Analysis By:** Dayna Ford

**Definition:** Digital wallets establish credentials to enable users to make remote or face-to-face transactions from connected devices such as mobile phones, desktops, kiosks and Internet of Things (IoT) devices. Credentials can be payment-related, such as bank cards, bank accounts and prepaid cards, or non-payment-related such as tickets, loyalty cards and boarding passes.

**Position and Adoption Speed Justification:** After a long slow start, digital wallets are finally gaining material traction globally, while not yet catching up to China which is one order of
The COVID-19 pandemic has accelerated adoption in many markets as much face-to-face commerce shifted to digital during nonessential business closures and global stay-at-home orders, and as consumers seek contactless ways to pay in essential face-to-face transactions. Deferred and installment payment wallets such as Klarna and Afterpay are gaining traction in new markets, most notably the U.S., and this trend may accelerate in the face of pandemic-related economic softening.

The top challenge facing digital wallet adoption has been the lack of a compelling value proposition for both consumers and merchants simultaneously. It takes more than efficiency and security to change ingrained consumer behavior, especially in mature payments markets with well-developed consumer use habits around traditional cards. Customers need to see a strong value proposition to change their payment behavior. For example, Starbucks and Walmart have gained momentum as they offer wallet services throughout their large networks of stores, with useful features such as quick check-out, loyalty points and targeted coupons. Organizations with strong brand and industry influence as well as a large captive customer base tend to be best positioned. Mobile providers such as Apple, Google and Samsung have the ability to leverage the device relationship to preprovision their wallet solutions and encourage consumer awareness and adoption.

It will take at least two years before most wallets develop value propositions that consistently appeal to customers and merchants.

User Advice: Enterprises interested in offering their own digital wallets should:

- Define the use case and customer benefits. If your business is related to payment solutions in industries such as parking, transportation, retail and e-commerce, look for ways to make the customer experience easier through the presence of digital wallets. Be aware of the large amount of upfront investment you need to commit to in order to market your solution and obtain resources necessary to support ongoing operations of the wallet. These include marketing, customer service, tech support, app development and payment integration. If your business is not directly related to providing payments, think through the value proposition question as to what benefits you can bring to customers. Successful solutions need to address real customer pain points.

- Understand the challenge of merchant acquisition in an increasingly regulated and crowded payment space. Merchants also need incentives and benefits before they are willing to invest in the technology to accept new digital wallets.

- Position digital wallets as a way to increase the value of your core product and service offerings. For example, retailers could include digital wallets in shopping apps to improve the in-store check-out process. Banks could include digital wallets in their banking apps to both complement their other services and increase the overall value of banking apps.
Move away from designing to the technology, such as the use of Near Field Communication (NFC) and quick response codes (QR codes), and toward a design focusing on customer value and experience.

Enterprises looking to integrate third-party wallets should:

- Understand the most popular digital wallets used by your customers and integrate those in addition to the traditional payment methods such as credit card or bank transfer.
- Balance the need to lower payment fees against the benefit of driving higher sales and conversion with a frictionless payment experience. Some wallets offer a streamlined customer experience. For example, PayPal and Amazon Pay support one-click payment, as do Apple Pay and Alipay with biometric authentication. Even though fees are often higher than traditional payment methods, the improved conversion may result in positive ROI.

**Business Impact:** Most businesses will not launch a stand-alone digital wallet to compete with leading payment players such as Alipay and PayPal. Rather, they will integrate wallets from those leading providers to promote customer engagement and drive higher revenue, or offer wallets as a natural extension of the existing business. For example, retailers like Starbucks and Walmart launched their own digital wallets by leveraging the advantages in captive user base, brand awareness and customer adoption incentives. In some markets (such as India and Switzerland) where there is a common digital payment infrastructure, industry players will work together to increase interoperability and acceptance. This could be a winning strategy, because participants get a share of a larger “pie.”

**Benefit Rating:** High

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Alipay; Apple; Early Warning Services; Gemalto; Google; Mahindra Comviva; PayPal; Paytm; Samsung Electronics; WeChat

**Recommended Reading:** “The Future of Commerce Payments in a Digital Society”

“How to Drive Adoption of Digital Wallets”

“12 Key Questions to Ask When Selecting a Digital Commerce Payment Vendor”

**B2C Dynamic Pricing**

**Analysis By:** Melissa Davis; Robert Hetu
**Definition:** Dynamic pricing algorithms for B2C organizations help maximize revenue from services, experiences and related products by identifying the optimal price, based on real-time supply and demand, promotional cadence, competitors’ pricing and customers’ profiles. Pricing for services, experiences and related products is becoming dynamic and optimized for supply and demand. Done correctly, dynamic pricing can provide value to both an organization and a customer.

**Position and Adoption Speed Justification:** Dynamic pricing, aka surge pricing, is not new. Airlines deployed the practice 40 years ago with super saver fares, whereby ticket prices changed constantly based on seat availability, passenger demand and the percentage of advance reservations for revenue management. Pure e-commerce retailers (such as Amazon) not having the physical restrictions on retail pricing of their multichannel competition, and online financial markets were early online adopters of dynamic pricing, enabled by large amounts of data and vast computing resources.

Today, the practice is rapidly expanding due to advances in computing power, low-cost demand-tracking sensors, bots that scrape prices from online sites, and pricing algorithms based on artificial intelligence (AI) that use real-time and historical data to predict customer and competitor reaction to price changes. Algorithms are coded to a goal, learn from data, and continuously update pricing options based on demand, inventory levels, popularity, scarcity and abundance.

Dynamic pricing with AI is now early mainstream and expected to reach the Plateau of Productivity within two years. Top industries to adopt dynamic pricing include travel/hospitality, e-commerce retailers, utilities, financial services and public transport.

**User Advice:** Implement dynamic pricing where there is a benefit to both the customer and to the organization. Failure to deploy dynamic pricing in this scenario can lead to a perception of unfairness by the customer, or to potentially serious legal compliance issues.

Introduce lower prices to customers:

- To be competitive, such as in online retailing. Today’s consumer is armed with a smartphone with real-time insight into prices across the competition.
- For better timing — the earlier a flight or hotel is booked, the more predictable the business.
- To encourage conversion, such as discounted or promotional pricing.

Present higher prices to customers:

- To offer customer convenience — such as a shorter check-in line.
- To provide premium services — such as extras/perks at a hotel.
- To deliver faster service — such as a business traveler paying more for a faster route.
Unfairness will be perceived when:

- Products/services are priced higher due to a monopoly or rarity — such as hotel rooms near a popular sporting event.
- Surge pricing is put in place following a natural disaster or other event, such as the COVID-19 pandemic where there was some overpricing of hand sanitizers and face masks.
- Prices of goods at a retailer’s physical stores are higher than on their online sites. A dynamic pricing approach for traditional retailers will require careful strategy and planning that includes associate education and time for customers to become familiar with the concept. By understanding customer behavior and utilizing advanced behavioral segmentation, organizations can determine the appetite and readiness for dynamic pricing.
- Personalized pricing based on a customer/profile/behavior such as different travel pricing based on device.

Not all companies have the organizational and business process maturity to implement dynamic pricing. Benchmark your current maturity against other organizations in your industry. Ensure that dynamic pricing is in the overall pricing strategy. Use alerting and thresholds to keep a human check on dynamic pricing impact. Ensure that reasons for price changes are transparent to your customers so that they can make informed choices and recognize that there is fairness in the rules.

To get started:

- During a crisis such as COVID-19, address customers’ pain points with flexible payment terms, unbundling, and one-time promotions.
- Begin with small, noncritical use cases to pilot and test the effectiveness of the pricing changes.
- Prioritize SaaS solutions for lower-cost/faster deployments.

**Business Impact:** Dynamic pricing can provide many benefits to both organizations and customers through increased sales and margins, faster reaction to competitive and situational events, and reduced costs:

- Automates manual price comparisons, rapidly adjusting prices according to changing customer behavior, location, product inventories and other contextual factors.
- Improves sales and margins by immediately addressing competitive pricing changes, aligning to consumers continuously searching for the best price.
- Improves sales and margins by offering a benefit and convenience to customers through preferential treatment at a premium price.

- Increases sales through reduced prices with the increased volume balancing the profit impact of lower margins.

- Minimizes unsold inventory.

**Benefit Rating:** High

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Acoustic; Blue Yonder; Boomerang Commerce; Flipkart (Upstream Commerce); PROS; Revionics; Vendavo

**Recommended Reading:** “Market Guide for Unified Price, Promotion and Markdown Optimization Applications”

"Are Your Algorithms Ethical? Look to Examples of Dynamic Pricing for Guidance"

**Customer IAM**

**Analysis By:** Michael Kelley; Henrique Teixeira

**Definition:** Customer identity and access management (CIAM) manages identity, authentication and authorization for customer access. CIAM is necessary for public-facing applications that require customers to register identities and create and use accounts.

Key CIAM features include:

- Self-service for registration (password, profile and consent management; progressive profiling)
- Authentication and authorization into applications
- Identity repositories
- Reporting and analytics
- APIs and SDKs for mobile applications
- Bring your own identity (BYOI)

**Position and Adoption Speed Justification:** Organizations are adopting more commercially available CIAM technologies, and there is growing preference for buying versus building. Some key elements of CIAM for CX include lightweight marketing functions, customer analytics, insights and
Customer engagement features. CIAM improves CX with adaptive access control, self-service profile, password management and BYOI integration options.

From GDPR in the EU, to LGPD in Brazil, to CCPA in California, growth in privacy regulation is driving growth in CIAM adoption. The need to comply with privacy regulations, from collecting consent to managing the need to be forgotten, highlights the increased need to provide consumer protections across all online businesses. These developments have moved CIAM further along the Hype Cycle based on increased adoption in the market and maturing IAM functionality, but native functionality for online fraud prevention, and preference and consent management are not yet fully developed.

User Advice: While there are some IT organizations that know how to build capabilities that get the online user experience "right," many organizations run very lean, and lack the skills and knowledge to develop an outstanding online customer experience. Our advice is to:

- Avoid developing CIAM capabilities that vendors can offer out of the box by acquiring commercially available CIAM solutions that: (1) are aligned to your strategy and staff expertise, and (2) provide a strong IAM infrastructure that supports native integrations for expansions. Significant business value is driven through marketing, sales and CRM integrations with CIAM.

- Use the intelligence provided by identity analytics and reporting features provided by CIAM products to dynamically discover and respond to ever-changing customer preferences and requirements.

- Develop a privacy strategy for customer identities, including choosing a CIAM vendor who has demonstrated the ability to meet the rising bar of privacy for customers. Pair CIAM capabilities with a consent and preference management tool for advanced functionality to strengthen the ability to comply with privacy regulations. And in financial services and retail industries, work with fraud leaders to augment CIAM with online fraud prevention tools.

Business Impact: In a world of near-instant gratification, the online portals of any business are the face of that business. Much like proprietors of the past coached their employees to greet customers walking in the front door with a smile, the modern web portal and mobile application have become the embodiment of that first impression for digital businesses. CIAM products are core to creating the outstanding user experience so necessary for success in online commerce and digital business.

There are other business benefits of adopting CIAM solutions. The first is optimization and efficiency — homegrown CIAM solutions can be a drain on developer and IT resources, both for support and for creating modern functionality. Second is the acquisition of knowledge for complying with privacy regulations. While CIAM vendors and software can’t comply with privacy regulation on behalf of an organization, they can provide the necessary technical mechanisms to enable an effective compliance program.
Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Sample Vendors: Akamai; Auth0; ForgeRock; LoginRadius; Microsoft; Okta; OneLogin; Ping Identity; Salesforce; SAP

Recommended Reading: “Technology Insight for Customer Identity and Access Management”

“Key Features for Customer Identity and Access Management”

“Critical Capabilities for Access Management”

“Solution Comparison for Customer Identity and Access Management Capabilities of 9 Vendors”

MDM of Customer Data

Analysis By: Sally Parker;

Definition: Master data management (MDM) of customer data enables business and IT organizations to ensure the uniformity, accuracy, stewardship, governance, semantic consistency and accountability of an enterprise’s official shared customer master data assets (including for example, customers, patients, and citizens). Such implementations enable the authoring of customer master data in workflow-, batch- or transaction-oriented processes that conform to one or more MDM implementation styles (or a hybrid of those styles).

Position and Adoption Speed Justification: The need for consistency of customer master data across business silos continues to drive the MDM of customer data market. Digitalization requires a unified view of the customer, which in turn depends on trusted customer master data. Organizations must integrate new data sources (often externally generated) to traditional customer activity. The race toward digitalization of business is, therefore, putting increased pressure on MDM of customer data efforts. MDM vendors are creating MDM-based business applications and continue to develop cloud-based offerings and integration to commercial business applications, along with social networks, big data and mobile initiatives.

MDM of customer data continues to progress along the Hype Cycle as interest and adoption increases. COVID-19 has prompted increased interest in MDM as organizations acknowledge the benefits of establishing an enterprisewide, trusted, view of their customer master data — greater agility to predict and respond to changes in customer buying patterns for example. But progress continues to be inhibited by failures due to inadequate program preparation and justification. Domain-specific MDM solutions and implementations are approaching the Plateau of Productivity more rapidly than MDM in general is, but will require at least two more years to reach it. Domain-specific implementations continue to progress toward being part of a larger MDM program or ecosystem. Additionally, confusion over what is master data, versus application, transaction or
relationship data, continues to be a drag on effective scope and progress toward a successful implementation.

**User Advice:** Organizations with customer data (including concepts like patient/provider in healthcare and citizen in the public sector) that is fragmented across systems should implement MDM of customer data. They should use a style that integrates with established source systems and provides a system of record for customer master data. MDM of customer data programs typically focus on improving operational business processes but can also benefit downstream analytical environments.

A successful MDM of customer data program requires more than technology. It requires a business-driven vision and strategy that focuses on key business problems. It is important to pursue a long-term MDM vision above any downstream technology strategy or solution capability, and to approach the individual projects of an MDM of customer data program based on business priorities. An MDM of customer data strategy should be part of a multivector MDM implementation strategy, which adds capabilities to a multidomain approach:

- The ability to meet requirements spanning multiple usage scenarios, implementation styles and data domains
- Any governance and organizational models supporting MDM

An MDM program is a key part of data and analytics, enabling greater enterprise agility, and should complement application-specific data governance requirements.

Evaluate solutions based on capabilities for data modeling and quality, integration, data stewardship and information governance, business services and workflow, measurement, and manageability. Ancillary technologies, such as enterprise service bus or an analytics platform, may also be required to accomplish your business goals. Be aware of well-hyped technologies in adjacent categories, like Customer Data Platforms (CDPs), which claim to offer customer MDM features, but often lack the capabilities Gartner expects from enterprise MDM platforms such as data quality, integration, stewardship and governance capabilities.

**Business Impact:** Trusted customer data and a trusted 360-degree view of the customer are fundamental to the success of any digitalization of business strategy or supporting element, such as a CRM or CX strategy. MDM programs and solutions are key components of these initiatives. The ability to identify customers correctly, and to draw on a trusted, accurate and comprehensive single customer view in customer-centric processes and interactions, is valuable for marketing, sales and service functions, and for other functions that interact with customers. In times of uncertainty such as COVID-19 the benefit of a holistic and trusted view of customer on which to base business decisions is invaluable. It can help organizations:

- Deliver the appropriate CX
In the era of social networks and other forms of big data, MDM of customer data is key to managing the linkages across the silos of customer data in these new data sources. It enables a trusted understanding of customers' sentiment and behavior.

**Benefit Rating:** High

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Ataccama; IBM; Informatica; Profisee; Reltio; SAP; Semarchy; Talend; TIBCO Software

**Recommended Reading:**
- “Magic Quadrant for Master Data Management Solutions”
- “Critical Capabilities for Master Data Management Solutions”
- “Choose Between Customer Data Platforms and MDM Solutions for 360-Degree Customer Insights”
- “MDM Is Critical to Maximizing CRM and Customer Experience”

**Visual Configuration**

**Analysis By:** Mark Lewis

**Definition:** Visual configuration enables a sales representative or end customer to see a visual representation of a product they want to order with the options and features they have selected. The best technologies enable the user to interact directly and in real time with the visual representation. These tools are most valuable to industries that manufacture highly customizable tangible products, such as automotive, apparel, medical devices, home building and furniture manufacturing.

**Position and Adoption Speed Justification:** Visual configuration encompasses a range of technologies that are at varying levels of maturity: 2D, 3D, mixed/augmented reality, virtual reality, floor space planning and computer-aided design (CAD). They are usually deployed as part of an overall configure, price, quote (CPQ) solution or as a component embedded within a digital commerce site. The adoption of visual configuration technologies is low but growing rapidly.
User Advice: In many industries, it is still possible to be an early adopter of visual configuration technology. Early movers will take market share from their competitors by significantly changing the way in which products are sold. If one of your competitors is already using this technology, you are probably being outsold and need to react quickly with your own initiative. Application leaders responsible for sales applications should evaluate early adoption of visual configuration technology.

Business Impact: Companies that implement visual configuration technologies experience significant business benefits:

- Higher win rates, because of faster creation of proposals that include CAD drawings or 3D renderings of the ordered product. For example, a major medical device manufacturer reduced the time to generate a proposal from 10 days to 10 minutes.
- Higher conversion rates on your website because consumers are more likely to buy a customized product if they can see what it looks like.
- Higher win rates, because the product is more compelling to a customer when they can see it and interact with it. For example, sales in a store increased by 20% in a virtual reality pilot that enabled prospective customers to walk through their new custom kitchen. Augmented reality has the potential to be even more impactful, because the prospect can see the new product in their own home or business premises.
- Lower rework costs, lower return rates and higher customer satisfaction, by eliminating misunderstandings between the customer and the vendor.
- Reduced or zero cost of manually drafting CAD drawings for proposals and manufacturing.
- Reduced need for physical samples and inventory items in sales showrooms.

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Early mainstream

Sample Vendors: 3D Source; CDS Visual; Configura; Cylindo; KBMax; Marxent; ORISA; ShapeDiver; SkyMaker; Threekit

Recommended Reading: “Innovation Insight for Visual Configuration”

Entering the Plateau

Recurring Revenue Management

Analysis By: Mark Lewis


**Definition:** RRM technology supports the presales and postsales processes associated with selling products and services on a subscription basis. RRM capabilities include subscription management, revenue recognition management, recurring billing, dunning and renewal management. Almost all industries now sell subscriptions. Examples of recurring revenue businesses include SaaS; digital media; communications; TV; consumables (such as razor blades and coffee capsules); and mobile value-added, professional and utility services.

**Position and Adoption Speed Justification:** Recurring revenue management (RRM) as a business model is mature and well-established, particularly for mobile, utilities and media. Most software vendors now sell their products as a service. There is a wide range of mature application software options available that can support the needs of any organization.

**User Advice:** There are nearly 100 vendors offering RRM solutions for every industry and organization size. There is likely to be consolidation in the market, so Gartner clients should be cautious when selecting a small, loss-making or niche vendor. Also consider leading CPQ vendors that now offer subscription ordering and some subscription billing.

**Business Impact:** RRM technologies enable companies in established subscription industries to replace legacy recurring billing systems, and companies in other industries to introduce a subscription business model. Automation of dunning processes can have a significant bottom-line impact by collecting more revenue. These solutions can also automate compliance with the latest revenue-recognition standards for services.

**Benefit Rating:** Moderate

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Mature mainstream

**Sample Vendors:** Amdocs; Apttus; Aria Systems; BillingPlatform; Chargebee; Gotransverse; Oracle; Recurly; Salesforce; Stripe

**Recommended Reading:** “Competitive Landscape: Cloud Subscription and Recurring Billing Management, North America”

**Price Optimization and Management for B2B**

**Analysis By:** Mark Lewis

**Definition:** Price optimization and management (PO&M) software enables an organization to efficiently manage and optimize the prices of its goods and services. More recently, these offerings have begun to support a wider range of sales intelligence advice, such as next-best-action recommendations and customer churn warnings. Some vendors focus on the back-office price management and product management roles; others focus on providing sales intelligence in real time to the sales representative. The most successful companies offer both.
Position and Adoption Speed Justification: Price optimization and management is close to the Plateau of Productivity because it is able to demonstrate quantifiable and tangible improvements in margin and revenue in successful implementations. Market penetration is low for such a mature product category because of historically high implementation costs. Recent lowering of those costs is increasing uptake and has also expanded the addressable market. The major vendors in this segment continue to make progress in making their products easier to implement. Ongoing improvements in machine learning and a growing focus on, and recognition of, the value of algorithmic business by senior executives are helping to raise awareness of the sector. New fixed-price or zero-price implementation packages, along with subscription pricing, make this technology accessible to a wider audience.

User Advice: PO&M is used primarily by large and global B2B or B2B2C organizations. These tools are most valuable when they are extended to the point of contact with the customer. This can include extending PO&M to a direct sales team accessing pricing tools on a mobile device or tablet, indirect sales channels that can access pricing through a partner portal or an inside sales support team, or a customer who can access dynamic, real-time pricing via a digital commerce site. Pricing “guardrails” can be created to let salespeople know if they are within recommended margin objectives for a particular price proposal.

Business Impact: Algorithms are driving digital business and strategies to maximize margins and profitability. The improvements in margin and revenue provided by successful PO&M implementations are achievable and quantifiable. Pricing is increasingly becoming dynamic and digital, requiring real-time microsegment pricing capability that includes the product, current demand, inventory availability, seasonality and multiple other criteria. PO&M will become more widespread as cost of deployment decreases and the demand for digital-enabled and algorithm-based pricing increases.

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Early mainstream

Sample Vendors: Perfect Price; Periscope By McKinsey; Price Edge; Pricefx; PROS; SPOSEA; Vendavo; Vistara Technologies; Vistex; Zilliant

Recommended Reading: “Market Guide for B2B Price Optimization and Management Software”

“Toolkit: RFP for B2B Price Optimization and Management Solutions”

Appendixes

Figure 3. Hype Cycle for Digital Commerce, 2019
Hype Cycle Phases, Benefit Ratings and Maturity Levels

**Table 1: Hype Cycle Phases**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Innovation Trigger</strong></td>
<td>A breakthrough, public demonstration, product launch or other event generates significant press and industry interest.</td>
</tr>
<tr>
<td><strong>Peak of Inflated Expectations</strong></td>
<td>During this phase of overenthusiasm and unrealistic projections, a flurry of well-publicized activity by technology leaders results in some successes, but more failures, as the technology is pushed to its limits. The only enterprises making money are conference organizers and magazine publishers.</td>
</tr>
<tr>
<td><strong>Trough of Disillusionment</strong></td>
<td>Because the technology does not live up to its overinflated expectations, it rapidly becomes unfashionable. Media interest wanes, except for a few cautionary tales.</td>
</tr>
<tr>
<td>Phase</td>
<td>Definition</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Slope of Enlightenment</strong></td>
<td>Focused experimentation and solid hard work by an increasingly diverse range of organizations lead to a true understanding of the technology’s applicability, risks and benefits. Commercial off-the-shelf methodologies and tools ease the development process.</td>
</tr>
<tr>
<td><strong>Plateau of Productivity</strong></td>
<td>The real-world benefits of the technology are demonstrated and accepted. Tools and methodologies are increasingly stable as they enter their second and third generations. Growing numbers of organizations feel comfortable with the reduced level of risk; the rapid growth phase of adoption begins. Approximately 20% of the technology’s target audience has adopted or is adopting the technology as it enters this phase.</td>
</tr>
<tr>
<td><strong>Years to Mainstream Adoption</strong></td>
<td>The time required for the technology to reach the Plateau of Productivity.</td>
</tr>
</tbody>
</table>

Source: Gartner (August 2020)

### Table 2: Benefit Ratings

<table>
<thead>
<tr>
<th>Benefit Rating</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td><strong>Transformational</strong></td>
<td>Enables new ways of doing business across industries that will result in major shifts in industry dynamics</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>Enables new ways of performing horizontal or vertical processes that will result in significantly increased revenue or cost savings for an enterprise</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>Provides incremental improvements to established processes that will result in increased revenue or cost savings for an enterprise</td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>Slightly improves processes (for example, improved user experience) that will be difficult to translate into increased revenue or cost savings</td>
</tr>
</tbody>
</table>

Source: Gartner (August 2020)

### Table 3: Maturity Levels

<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Status</th>
<th>Products/Vendors</th>
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<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Status</th>
<th>Products/Vendors</th>
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</thead>
<tbody>
<tr>
<td>Embryonic</td>
<td>In labs</td>
<td>None</td>
</tr>
<tr>
<td>Emerging</td>
<td>Commercialization by vendors</td>
<td>First generation</td>
</tr>
<tr>
<td></td>
<td>Pilots and deployments by industry leaders</td>
<td>High price</td>
</tr>
<tr>
<td></td>
<td>Maturing technology capabilities and process understanding</td>
<td>Much customization</td>
</tr>
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<td></td>
<td>Uptake beyond early adopters</td>
<td></td>
</tr>
<tr>
<td>Adolescent</td>
<td>Maturing technology capabilities and process understanding</td>
<td>Second generation</td>
</tr>
<tr>
<td></td>
<td>Uptake beyond early adopters</td>
<td>Less customization</td>
</tr>
<tr>
<td>Early mainstream</td>
<td>Proven technology</td>
<td>Third generation</td>
</tr>
<tr>
<td></td>
<td>Vendors, technology and adoption rapidly evolving</td>
<td>More out-of-box methodologies</td>
</tr>
<tr>
<td>Mature mainstream</td>
<td>Robust technology</td>
<td>Several dominant vendors</td>
</tr>
<tr>
<td></td>
<td>Not much evolution in vendors or technology</td>
<td></td>
</tr>
<tr>
<td>Legacy</td>
<td>Not appropriate for new developments</td>
<td>Maintenance revenue focus</td>
</tr>
<tr>
<td></td>
<td>Cost of migration constrains replacement</td>
<td></td>
</tr>
<tr>
<td>Obsolete</td>
<td>Rarely used</td>
<td>Used/resale market only</td>
</tr>
</tbody>
</table>

Source: Gartner (August 2020)

Evidence

This Hype Cycle draws on data collected by Gartner’s Secondary Research Services unit, and from users of Gartner’s client inquiry service, analysis of vendor briefings and conference surveys, and
Gartner search analytics.

Gartner's Digital Commerce State of the Union 2019 survey was conducted online from 11 November through 4 December 2019 with 88 members, 40 were Research Circle Members — a Gartner managed panel and 48 were from external sample. Respondents were required to be from organizations that sell via digital commerce platforms. The survey was developed collaboratively by a team of Gartner analysts and was reviewed, tested, and administered by Gartner's Research Data Analytics team.

Gartner's Privacy & Personalization Survey was conducted online from 7 February through 20 February 2020 with 156 completes from Gartner Research Circle Members — a Gartner-managed panel. Participants were screened for having involvement or visibility into strategic decisions related to the organization's customer experience, privacy or data and analytics. The survey was developed collaboratively by a team of Gartner analysts and was reviewed, tested, and administered by Gartner's Research Data Analytics team.

Gartner's Customer Experience Innovation 2020 survey was conducted online from 17 January through 24 February 2020 and in late April 2020 among 238 respondents to understand priorities, working relationships and response to situations faced in Customer Experience initiatives. Companies were screened for having minimum $50 million annual revenue for last fiscal year and a minimum of 250 employees worldwide. The study was developed collaboratively by Gartner Analysts and the Primary Research Team.

Document Revision History

Hype Cycle for Digital Commerce, 2019 - 5 August 2019
Hype Cycle for Digital Commerce, 2018 - 25 July 2018
Hype Cycle for Digital Commerce, 2017 - 31 July 2017
Hype Cycle for Digital Commerce, 2016 - 7 July 2016
Hype Cycle for Digital Commerce, 2014 - 29 July 2014
Hype Cycle for E-Commerce, 2013 - 31 July 2013

Recommended by the Author

Understanding Gartner's Hype Cycles
What's Hot in Digital Commerce
2019 Strategic Roadmap for Digital Commerce
Predicts 2019: New Deployment Models, Channels and Technologies Spark Digital Commerce Growth
Cool Vendors in Digital Commerce
Innovation Insight for Visual Configuration
Magic Quadrant for Digital Commerce
The Three Approaches to Digital Commerce Platform Architecture and How to Choose Among Them
Use Privacy to Build Trust and Personalize Customer Experiences

Recommended For You
Gartner Peer Insights ‘Voice of the Customer’: Digital Commerce
Critical Capabilities for Digital Commerce
Magic Quadrant for Digital Commerce
2019 Strategic Roadmap for Digital Commerce
3 Ways to Jump Start Digital Commerce

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