Ovum Decision Matrix: Selecting an Enterprise Mobile Application Development Platform, 2018–19
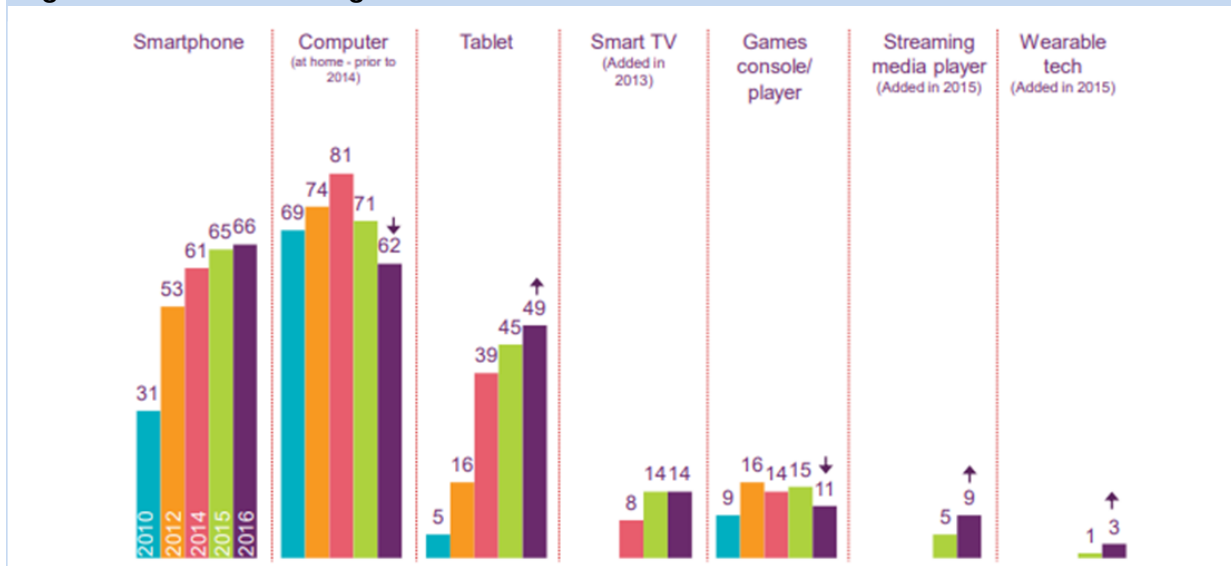
Summary

Catalyst

The enterprise mobile application development platform (MADP) is now a well-established category of development tools, but its makeup continues to evolve with the changing needs of enterprises. The two significant changes we have seen since the last Ovum MADP report is support for low-code/no-code (LCNC) development, and the rise of artificial intelligence (AI) in mobile devices and applications. The raging debate of native versus hybrid versus open web standards has quietened to a large degree due to the rationalization of mobile OSs, with native the overall winner. In this report, Ovum compares eight MADP solutions from the leading players, across an extensive range of technical features, market execution, and market impact, to help enterprises with their mobile strategy.

Ovum view

Market overview: OS wars are over for now (Android and iOS have won)
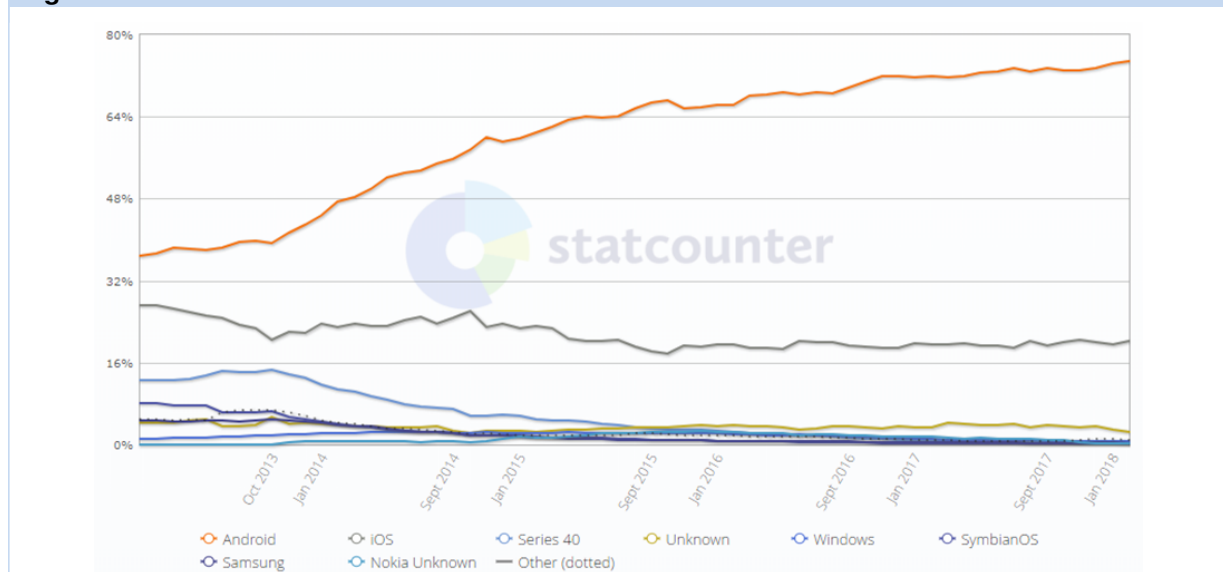
Mobile devices have been transformative in the digital economy, with people choosing to spend more time on their phone or tablet, engaging with content or running apps. In the *Ofcom Adults' Media Use and Attitudes Report, June 2017*, based on surveys in 2016 (see Figure 1), the smartphone was the dominant device adults spent their time on in 2016. Mobile usage, including phones and tablets, is on an upward trend, whereas computer usage is in decline. The sample size was 1,846 adults aged 16 or over. Arrows in Figure 1 show significant changes.

Figure 1: Devices used to go online 2010–16

Source: Ofcom

When smartphones became established, one of the most common questions Ovum was asked by its enterprise customers was whether to build native, hybrid, or open web standards (HTML5, JavaScript, and CSS3) apps. In the early days, the mobile market was a lot more fragmented than it is now. Figure 2 shows the market split by OS over the last five years.

Figure 2: Mobile OS market share worldwide: 2013–18

Source: StatCounter

By September 2014, the market had reduced to essentially two main OSs: Android and iOS. In North America, where iOS had traditionally had a majority hold, the gap with Android had reduced to near parity in September 2014.

In 2018, however, Android is the dominant OS with 74.8%, and iOS is the second most popular with 20.1%, accounting between them for almost 95% of the market.

These statistics have implications for developers: the stability in OS adoption and reduction to two main players means that building for native is no longer a difficult choice spread across multiple OSs. The advantage of building native apps is that as the providers (Google for Android, and Apple for iOS) release new versions, it is easy for developers to upgrade to the next generation OS, and create apps with the latest look and feel. Certainly, for B2C apps, where retaining customer attention is difficult, having the latest OS style can be important.

Native apps also have an edge in performance capability. This can be important for apps that stretch the mobile device to its limit, such as, for example, when processing large amounts of data, or running AI-based apps. Building native apps means having two teams each devoted to either Android or iOS, or having multi-skilled developers.

With hybrid, the approach is to build a single model so that the MADP solution can then generate native code for both Android and iOS. A single development language, typically JavaScript, is used to create the app, but the solution will generate pure native code. There is also a web hybrid that has the appearance of a native app but runs in a browser, typically using Webview, which makes the browser look like an app. The development language is open web standards-based, so only a single set of development skills is required.

For users, both native and hybrid are apps that are downloadable from app stores, and unlike web apps, the apps can send push notifications to users, which enhances stickiness. Native and hybrid apps also make it easy to share content between them, so social media apps can work optimally.

Finally, open web standards-based apps run in browsers, and use the trio of HTML5, JavaScript, and CSS3 (with HTML6 and CSS4 on the horizon). The styling of web apps is dependent on the pace of

evolution of the web standards, and by its nature will always lag advances in native OS styling. An advantage of web apps is that they can be immediately downloaded from the originator without having to navigate an app store.

For enterprises, there is certainly a case for using multiple types of apps, and to be able to rapidly put a hybrid or web app into the market to test the water. But the main choice for developers is whether to use open source tools and build apps directly (the DIY route), or use an enterprise MADP solution. The DIY development route might save tool license costs, but at the expense of using a multitude of frameworks that developers change frequently, with hard-to-find skilled developers to use the tools in high demand. The DIY route requires careful consideration of total cost of ownership.

Most MADP solutions use a single model to create an app and then generate native apps out of it, so users need only learn one development language. Some of the MADP solutions are also agnostic to the client-side development choices, so will integrate with the developer's preferred user interface (UI) development tools.

Key findings

- Digital transformation is a major drive for change in businesses. With consumers spending more time on smartphones, enterprises need to build apps to engage with them.

- The appeal of mobile application development capabilities is set to increase as organizations look to not only develop new app experiences, but also to modernize and mobilize legacy systems.

- The mobile device OS wars are over for now, with Google Android and Apple iOS the winners. This has rationalized the fragmented OS market and has made native development the dominant choice for mobile apps.

- The MADP market has rationalized to some extent; the major IT players have taken a stronghold, with the remaining pure-play MADP vendors thriving and competing well.

- Low-code/no-code development has been a niche market but with LOB pressure, it has become part of mainstream MADP solutions, and has helped grow enterprise MADP.

- With the rise of AI technology, AI apps are expected to become more prevalent, and MADP providers are anticipating this trend with features to support AI app development.

- With 5G only a few years away, there will be a need to support augmented reality (AR), virtual reality (VR), and AI in advanced mobile apps including IoT, and leading MADP solutions can offer support for these technologies.

Market and solution analysis

Ovum Decision Matrix: MADP, 2018–19

This Ovum Decision Matrix for Mobile Application Development Platforms recognizes the wide range of features and functionality required in such solutions. Enterprise MADP solutions encompass a wide range of features to support professional developers as well as "citizen developers" or power users, people with business domain expertise who have some programming knowledge, and those without programming knowledge. MADP solutions provide a one-stop solution that enables developers to

model, code, and deploy mobile apps from one environment. They also often include some elements of application lifecycle management (ALM) tooling such as test management, and with agile and DevOps practices now well established, support for continuous integration and delivery.
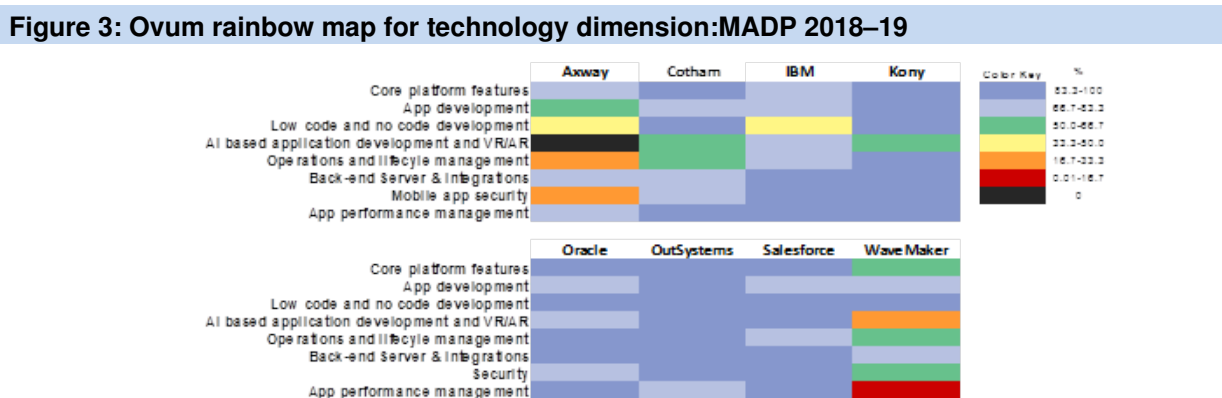
While the mobile device is dominant in terms of attention time spent by users, older devices such as desktop computers are still an important category, and MADP solutions typically have broad target support. It is therefore also relevant for MADP solutions to build cloud-native applications using microservices and containers.

AI and machine learning is a hot topic. Mobile apps are making increasing use of AI-based voice control, and the trend for mobile devices to carry more powerful microprocessor accelerators for AI that will open up the range of AI-based apps that developers can build. In the future Ovum expects that processing big data locally will also be possible, as will local training of AI systems. AI on mobile is new, and MADP solutions will need to support its development with, for example, ready-built components and integration with popular AI libraries.

In this Ovum Decision Matrix, MADP solutions were evaluated across three dimensions: Technical features, market execution, and market impact. The technical features are grouped into eight categories:

- Core platform features
- App development
- LCNC development
- AI-based app development and VR/AR
- Operations and lifecycle management
- Back-end server and integrations
- Mobile app security
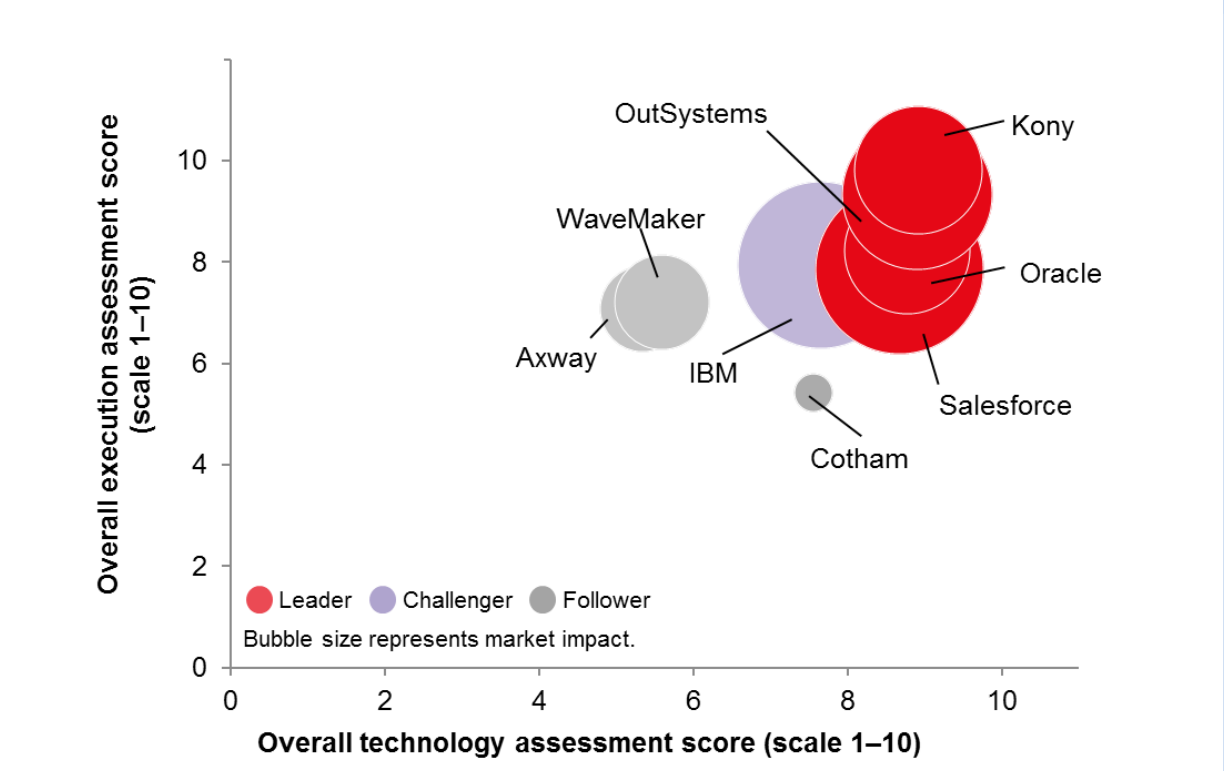- App performance management.

The results of the technology evaluation (excluding the market impact and execution categories) have been processed into a reverse heat map (see Figure 3), the Ovum Rainbow Map, where the blue end indicates good support and the red end poor support (black means no feature at all). The scoring percentage key for the colors is shown in the top right of the figure.

Figure 3: Ovum rainbow map for technology dimension:MADP 2018–19
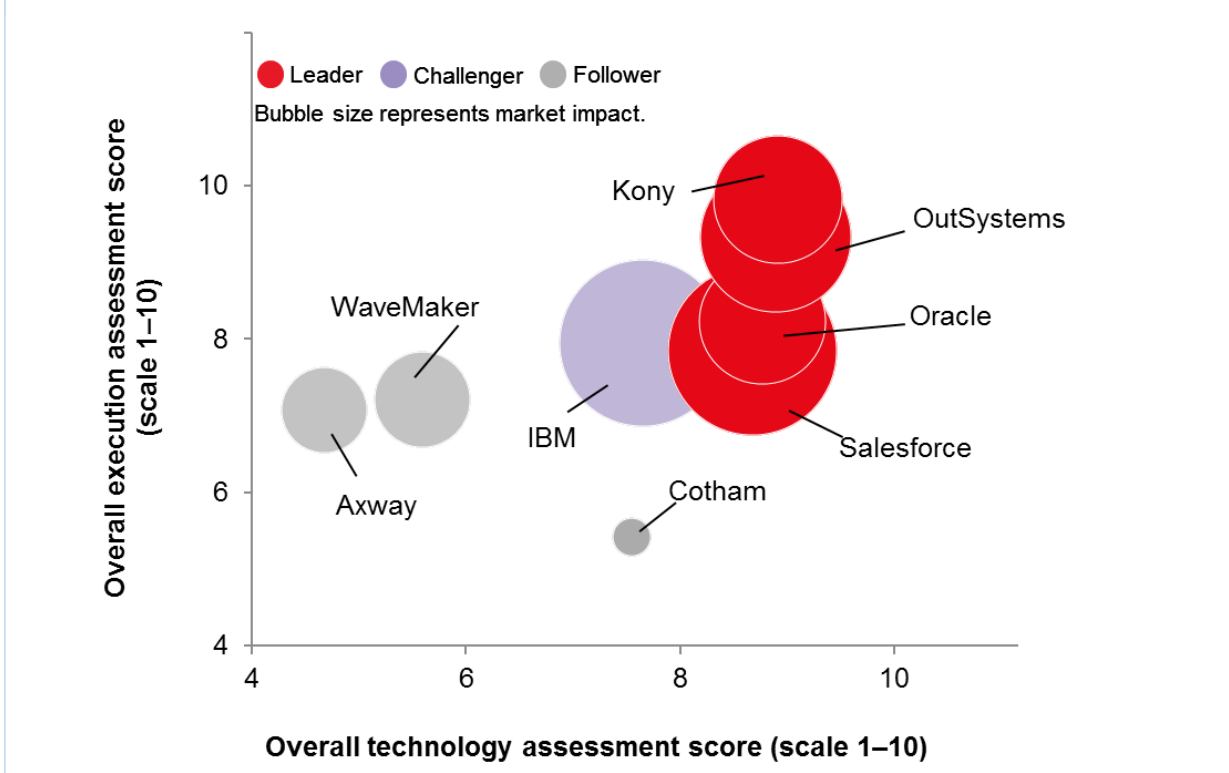

Source: Ovum

Figures 4 and 5 show the Ovum Decision Matrix results for the full MADP evaluation (technology, market impact, and execution categories). The vendors are grouped into three tiers, and these groupings by tier can be seen in Table 1. Vendors in each tier are listed in alphabetical order.

Figure 4: Ovum Decision Matrix: MADP 2018–19

Source: Ovum

Figure 5: Expanded view of Ovum Decision Matrix: MADP 2018–19

Source: Ovum

Table 1: Ovum Decision Matrix: MADP 2018–19

Market leaders	Market challengers	Market followers
Kony	IBM	Axway
Oracle		Cotham Technologies
OutSystems		WaveMaker
Salesforce		

Source: Ovum

Market leaders: Kony, Oracle, OutSystems, Salesforce

The market leaders identified in this report represent the leading solutions that Ovum believe are worthy of a place on most MADP technology selection shortlists. Vendors in this category have established a commanding market position with a comprehensive and capable product that is widely accepted as best-of-breed.

Kony

Kony is at the forefront of the mobile application development market's move from a mobile-only to an omnichannel digital experience. Moreover, enterprise mobile app development has moved away from being the sole domain of dedicated developers and toward supporting low-code development where

LOB staff can develop applications themselves. The capabilities offered by the Kony platform support people with different levels of app development skills and experience. What used to be Kony Studio is now subsumed in Kony Visualizer, which provides a unified IDE for designing rich user experiences, custom coding, prototyping, and low-code development. Kony Fabric back-end services provide support for the latest microservices and DevOps styles of architecture and deployment. The combination of Kony Visualizer and Kony Fabric comprise the latest generation of the Kony AppPlatform, which enhances the low-code development with an omnichannel engine. This gives LOB users the ability to create native mobile, mobile web, and desktop, chat, and IoT apps and link these to back-end data sources and systems.

Oracle

Oracle Mobile Cloud enables professional developers, LCNC users, and LOB staff to deliver mobile apps for customers and users. With artificial intelligence applications being highly topical, Oracle's solution stands out because it already enables clients to incorporate voice-enabled devices, cognitive services, image recognition, and messaging in a single development environment, all of which is underpinned by Oracle Intelligent Bots. Oracle's mobile practice is also a default provider across Oracle's platforms for client-facing solutions that it calls "wiring the front-end to the enterprise". Clients can integrate mobile and web apps as well as immersive technologies, such as augmented reality, by using development tools and SDKs that can be connected to Oracle's SaaS and PaaS cloud services.

OutSystems

A key digital transformation objective for organizations is that of digitizing and modernizing legacy systems and applications. The mobilization of these systems is a key mandate for many, and solutions that enable a wide variety of employees to create apps and digital workflows easily are increasing in appeal. OutSystems is a low-code application development platform that accelerates the delivery of mobile, web, API-based bots and conversational applications, helping broaden app development. The solution empowers developers with a single, integrated development environment that covers the entire development lifecycle (development, quality assurance, deployment, monitoring, and management).

Salesforce

Salesforce Mobile is a platform-as-a-service (PaaS) extension of Salesforce's CRM offering. Apps are developed using the Lightning Platform (formerly called Force.com), the Salesforce SDK, and Heroku (a platform for apps creation, production, scaling, and management). Salesforce Mobile empowers both developers and LOB staff to develop mobile apps. Like the company's other software applications, Salesforce Mobile pricing is based on consumption of the mobile apps. Key features include integrating mobile apps with Salesforce Einstein to enable enterprises to realize value from AI and machine learning, and Salesforce's wide network of SI partners and engaged user groups that give customers many possibilities to receive project delivery support.

Market challengers: IBM

The solutions in this category have a good market positioning and offer competitive functionality; however, not as comprehensive a set of capabilities as those offered by solutions in the Leader category.

IBM's MADP comprising Mobile Foundation v8.0 and Mobile services on IBM Cloud (IBM Mobile) enables enterprise developers to deliver personalized mobile apps. IBM covers the back-end

integration for mobile deployments while also providing tools to help simplify building, managing, and updating the front end of mobile apps. The company can deploy solutions on-premises, on the cloud, or as a hybrid solution. IBM Mobile, which is designed for professional developers, includes a range of popular form factors including iOS wearables. With IBM opening its own public cloud, formerly called Bluemix and now called IBM Cloud, users have the option to work with software-as-a-service (SaaS) tooling and SaaS deployment options.

IBM was a leader in our previous MADP ODM, but has lost this position and is now a challenger as a result of its decision to form a partnership (with Mendix) for LCNC tooling. The IBM Mobile solution has leader qualities in all other respects.

Market followers: Axway, Cotham Technologies, WaveMaker

Solutions in this category are typically aimed at meeting the requirements of a particular kind of customer. These solutions do not offer as broad a set of capabilities as those technologies identified as leaders or challengers, but they are still worth exploring by organizations looking at adopting a MADP solution.

Axway

Axway Amplify App Developmentsolution, part of Axway's Amplify xPaaS Platform, provides MADP components across the mobile application development lifecycle. Amplify Appcelerator Studio provides clients with a unified development environment based on the Eclipse platform, an open source integrated development environment (IDE) that enables developers to quickly build, manage, and package mobile applications. In January 2016, Axway acquired Accelerator, which created one of the most popular open source mobile development frameworks, Amplify Titanium SDK. Titanium SDK is at the core of the Axway offering.

Cotham Technologies

We evaluated MADP solutions from leading vendors in this space, with one exception: Newcomer Cotham Technologies, which only came out of stealth mode in January 2018. As a new product, this solution did not meet our selection inclusion criteria, but nevertheless we gave it an opportunity to be compared with leading solutions because we see a promising future for this tool.

Cotham Technologies is a new-generation enterprise MADP vendor with two notable characteristics. First, its FloPro platform provides a no-code approach to mobile app development, and second, FloPro can be used on a tablet, with the results instantly displayed. FloPro has a distinctive development method, with mobile applications created using a metadata-driven development model. The model is designed so that the basic functionality of an app is defined as metadata in a database, rather than being hard coded in a programming language. Apps can be built with customized or off-the-shelf components, and again, this is typically achieved without coding.

WaveMaker

WaveMaker Rapid is an open standards-based platform that enables developers to create both mobile and web applications based on a modern technology stack. The platform covers the entire lifecycle of application delivery from development, QA, through to production. The Rapid platform offers flexibility with no vendor lock-in with regard to deployment environments, and support for infrastructure players such as AWS, Microsoft Azure, and IBM Cloud. In addition, WaveMaker's API-first philosophy makes apps inherently microservices-ready, to integrate well with cloud-native

computing environments. The solution's key strength is in addressing both traditional developers and low-code development needs.

Other vendors

Several vendors that offer MADP solutions were not included in this ODM because they did not meet the inclusion criteria.

Temenos with its user experience platform (UXP) is a noteworthy LCNC MADP product that in its former life (as edgeConnect) was targeted at all verticals. Under Temenos, the product is, however, now solely focused on the financial services industry, and therefore did not meet our selection inclusion criteria which requires no vertical restrictions. Nevertheless, this product has features that would otherwise have included it in our assessment, and is worth considering, particularly for financial services applications.
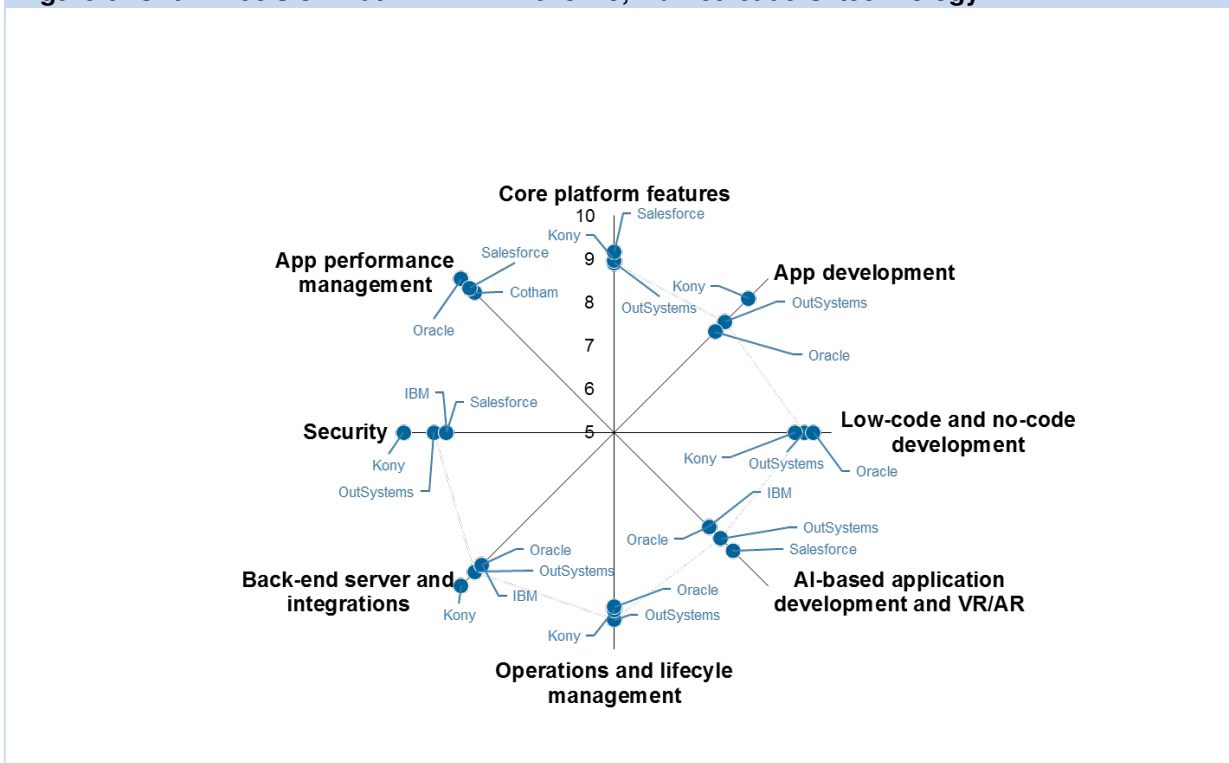
Other vendors that offer MADP solutions but were not included in this ODM are AWS, Microsoft, and SAP.

In addition to our participating ODM vendors, enterprises should also consider these vendors when shortlisting solutions.

Market leaders

Market leaders: Technology

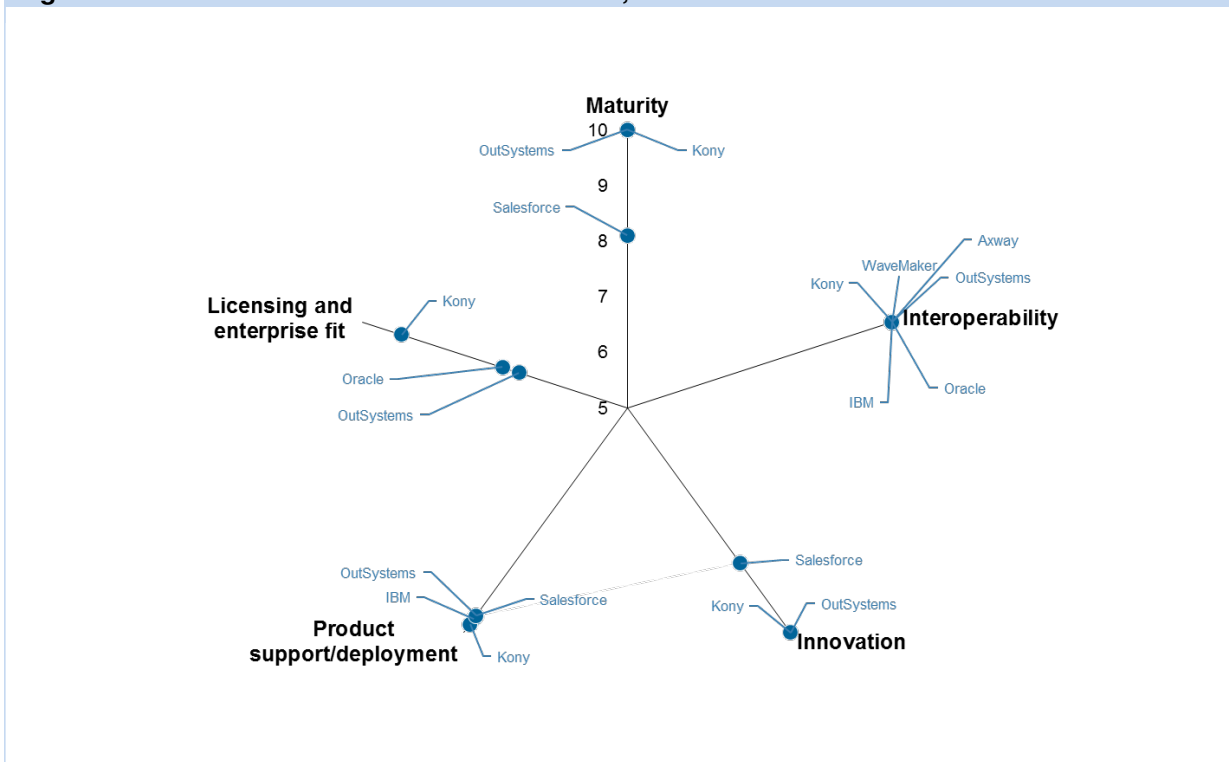**Figure 6: Ovum Decision Matrix: MADP 2018–19, Market leaders–technology**

Source: Ovum

All the leader vendors in the technology evaluation achieved very close scores (see Figure 6), reflecting a common positioning to market drivers. Notably, low-code/no-code development, which had been a niche tool category, is now mainstream MADP, driven by line-of-business (LOB) demand for mobile aps and digital transformation, and offered by all the leaders.

The rise of AI technology is also impacting mobile apps, and the leading vendors have all positioned themselves to address this burgeoning market. Finally, the trend to cloud-native computing is also impacting the way in which mobile apps connect to back-end systems, and again, the leaders have all anticipated this need. In all the traditional MADP areas, the leading providers show excellent feature support.

Market leaders: Execution

Figure 7: Ovum Decision Matrix: MADP 2018–19, Market leaders–execution

Source: Ovum

Questions in this dimension by category are maturity (how long has product been in the market, the roadmap), interoperability (out-of-the-box integration, APIs), innovation (in technical features, business support), product support and deployment (industry solution templates, how easily product is updated), and licensing and enterprise fit (the total financial investment for the solution, including licensing, maintenance, and support for various scenarios). Kony and OutSystems performed exceptionally well, followed by Oracle and Salesforce (see Figure 7).

Market leaders: Market impact

Figure 8: Ovum Decision Matrix: MADP 2018–19, Market leaders–market impact

Source: Ovum

The market impact dimension of the ODM is largely weighted by the vendor's revenue, with all the leading vendors showing significant earnings. Also affecting this dimension are revenue growth, size of customer base, size of partnership base, and vertical industry penetration. Overall, Salesforce showed the strongest score, followed by Kony, OutSystems, and Oracle (see Figure 8). Noteworthy are the positioning of Kony, a pure-play MADP vendor, and OutSystems, which has a wider scope beyond MADP. These vendors are competing effectively against major IT industry behemoths IBM, Oracle, and Salesforce.

MADP market trends

Low-code/no-code solutions, AI, and 5G

Ovum has identified two key trends in low-code/no-code solutions and AI. LCNC development empowers domain experts, such as business analysts with some limited programming background, to build LOB or departmental apps. LCNC systems make it easy to rapidly build apps without requiring resources from central IT. They help LOBs to get through their app backlog, and allow for greater control over the development direction, because the people building the app have a closer relationship with stakeholders and end users. Previously, LCNC was only a niche part of the MADP market, but now nearly every MADP provider has this capability.

AI has become a hot topic in recent years with the success of machine learning, and in particular, deep learning. For more background, see the Ovum report *Artificial Intelligence Technology and*

Applications. Most of the solutions in this ODM have machine learning features for building AI-based apps. These features can be considered a first-generation release, and we expect more features as mobile device manufacturers install AI acceleration hardware to allow these apps to do more processing locally, allowing greater innovation in app development.

Finally, 5G is due for launch in 2020 (with fixed wireless access due in 2019). This will bring several benefits: Faster download speeds (from 1Gbps to 10Gbps, depending on how advanced the implementation and infrastructure is by country); reduced latency, making the mobile network comparable with WiFi connections; and increased bandwidth capacity, opening the frequency spectrum, with intelligent allocation of bandwidth based on user app needs. Overall, the experience for the user will be one of continuous connectivity. Widespread availability of 5G will take a few years from launch, with 2022 the current estimate for the UK.

For developers, 5G will lead to apps that can be richer in content, and perform more without suffering from connectivity restrictions and latencies. Applications that will benefit from 5G include: AI with its high data usage, whether for training AI apps locally or streaming data processed by AI apps locally or sent to the cloud; Internet of Things (IoT) apps that will be able to work seamlessly on the mobile device without performance restrictions; and enhanced augmented reality (AR) and virtual reality (VR) mobile apps.

Mobile app development is becoming an important strategic business discipline

Organizations are beginning to approach enterprise mobility in a more strategic way, and mobile app development is a key element of this shift. Recent Ovum data has shown that modernizing and mobilizing legacy apps is an enterprise mobility objective, with 22% of enterprises saying it is a priority, putting it second only behind improving security in terms of importance to businesses. Mobile app development will be key to this effort, and organizations recognize this, with 62% of respondents to the same survey saying they have plans to use mobile application development technologies or services within the next 24 months. When the BYOD trend gathered momentum, approaches to enterprise mobility were very much centered on the device and how to manage and secure it. Now, however, organizations are taking a more mature approach toward mobility, with apps especially viewed as an important element in helping optimize business processes and service experiences. Solutions that support organizations in modernizing and mobilizing legacy systems will be important tools for businesses looking to realize value from digital initiatives.

How to evolve an approach to enterprise mobility in embracing more app development and management capabilities can be challenging. Organizations are often unsure about where to start when mobilizing existing business systems and applications. While it might be tempting to think in a grandiose way in terms of mobile app development, a big-bang approach is not desirable. When getting started, organizations should identify an opportunity to develop a non-business-critical new employee app or existing system that impacts only a select number of users. Establishing collaboration mechanisms between project managers, developers, IT operations, and those set to utilize the app is imperative, as is the support of capable development tools and technologies. Defining the purpose and objective of the app is another important early step, and one that will require insight around not only what technology is required, but also the user needs that will shape how the app is used.

One of the first decisions that organizations must make once requirements are understood is whether to deploy an off-the-shelf app or create a bespoke custom app. Lessons and insights around costs, development considerations (UX design, development practices, and so on), skills required, technology used, and the feedback gathered should also all be noted and used as part of continual improvement efforts. Above all, it is important to adopt a people-centric approach to app development that uses mobile to truly transform and optimize the way in which people work, and to encourage new ways of working, as opposed to simply layering mobility on top of archaic business processes and workflows.

Security and governance are important considerations

For organizations looking to broaden or mature any approach to mobile app development, security and governance are important considerations. As data becomes increasingly fragmented and accessible through mobile apps, organizations need to ensure that effective practices around how it is managed, accessed, and secured are in place. To help, traditional authentication mechanisms and capabilities are increasingly being complemented with more modern methods, such as biometrics. These solutions often enable the layers of security to be applied not only at the app level, but also at the level of individual features within the app, further strengthening security, and at a quite granular level. Organizations will also need to carefully consider and align with new General Data Protection Regulation (GDPR) requirements when developing new mobile apps. Ensuring that only the necessary data is gathered from users of any app, and that this data is encrypted appropriately, are important considerations. It is also important to be transparent about how any data gathered will be used and potentially shared.

Governance is another important consideration, particularly for organizations looking at broadening any approach to app development through low-code solutions. As more people are empowered with technology that enables them to create apps that use sensitive data, the potential for this data to leak also increases. There is also the potential for work duplication, specifically how one person or business unit may spend time creating an app that may already been created by someone else. Some businesses have overcome this issue by holding hackathons where employees are invited to submit an app they have developed to be judged by other employees within the business. The apps that are most positively received are then rolled out into the live environment. This not only helps reduce potential work duplication, but it can also help expose more employees to the existence and value of newly created apps.

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Vendor analysis

Axway (Ovum recommendation: Follower)

Figure 9: Axway radar diagrams

Source: Ovum

Products

Axway Amplify App Development Solution

ODM analysis

In addition to the SDKs, mobile analytics, and API development capabilities, Amplify App Builder is an attractive proposition to enterprise clients because of its network of system integrator partnerships in North America, EMEA, Asia-Pacific, and Latin America. Furthermore, Axway offers clients a number of support packages, including an Axway Solutions Architect who provides ongoing insight and mentorship to customer development and QA teams. The Axway Professional Services offering also provides mobile solution consulting to support ongoing app development, and testing and deployment services. These additional support mechanisms are important because mobile development can be complex, and these programs can be beneficial in optimizing deployment time of any solution, lowering maintenance costs, and helping improve utilization due to the in-depth expertise provided. Note that the solution does not support popular development languages such as Java, C/C++, PHP, and Python.

Strengths

Easily connects apps to other back-end systems

Developers need to have confidence that the mobile apps they deploy will have seamless integration with the company's back-end systems. The success of an omnichannel strategy will hinge on the effective collection and storage of data. The Amplify App Development solution, based on Node.js, is able to integrate with any back-end system and incorporates Amplify Titanium SDK and the Amplify API Builder. Much like the low code-focused suppliers, Axway is taking a similar approach for connecting the back-end systems, but is also providing connectors and APIs to an enterprise's systems of record, without the need for staff to be experts in data integration. Having confidence that an app can be easily connected to other systems means that developers can focus more on the front-end development.

Native app development

Another headache for developers is the need to be aware of the different operating systems that underpin mobile apps and enterprise applications. The Amplify Titanium SDK enables developers to have a native app environment so that they write it once and deploy on multiple platforms/operating systems. Deploying apps with Axway can shorten the time it takes to deploy apps to users and customers.

Weaknesses

Brand recognition

The MADP market is crowded with traditional suppliers of enterprise applications looking to develop their install bases. Axway is not well known in the industry, so the company needs to commit resources to a brand-building campaign among enterprise developers. Otherwise, it will not be considered by enterprise clients and will be squeezed out of the marketplace. The company should consider highlighting the Titanium brand, which has global recognition.

Knowledge of JavaScript is required

With the advent of low-code/no-code solutions, MADP is no longer the sole domain of enterprise developers. Using platforms with, for example, drag-and-drop functionality means that staff whose day to day role is not IT-related can create apps that are equivalent in terms of usability and performance to those developed by full-time developers.

Despite all documentation being online, backed up with support in public forums, basic JavaScript skills are required to start using Amplify Titanium SDK and the rest of the Axway Amplify App Development solution. This prevents Axway from targeting organizations looking for apps that LOB teams can develop themselves.

Opportunities

More engagements around Axway Mobile Analytics

Axway has a query builder for Axway Mobile Analytics that provides usage, performance analytics, and custom analytics APIs for heat maps, cohort analysis, and customer segmentation models. All these capabilities can add a level of sophistication to Axway's offering. In addition, Axway should expand its analytics offerings by incorporating machine learning capabilities so that customers can train AI systems to deliver insights that are precisely tailored to the business. MADP suppliers need to

have AI and machine learning on their roadmaps as enterprise customers look to leverage these technologies to deliver insights on their customers and operations.

Omnichannel developments

Becoming a partner that can deliver on a client's omnichannel aspirations is fast evolving into the sweet spot for MADP suppliers. Clients are now broadening their ambitions to reach customers not only via their laptops and smartphones but also smart speakers, wearable devices, and IoT devices. During 2018 and beyond, Amplify Titanium and Amplify App Development will have more channels for receipt and distribution of data. These include VR, chatbots, watchOS, connected cars, and IoT protocols. These innovations will ensure that Axway can support clients' wishes to deliver their apps to both traditional and contemporary devices.

Boosting enterprise customer experience

Axway is looking to help organizations with their digital transformation strategies, with the Axway Amplify platform providing clients with a set of tools and services to deliver their customer experience network (CXN). This provides opportunities for Axway to be perceived not only as a provider of solutions for app development but also as a partner in developing clients' digital strategies. Having high-value services as well as applications will protect Axway from margin erosion as the MADP market moves toward more standardized platforms.
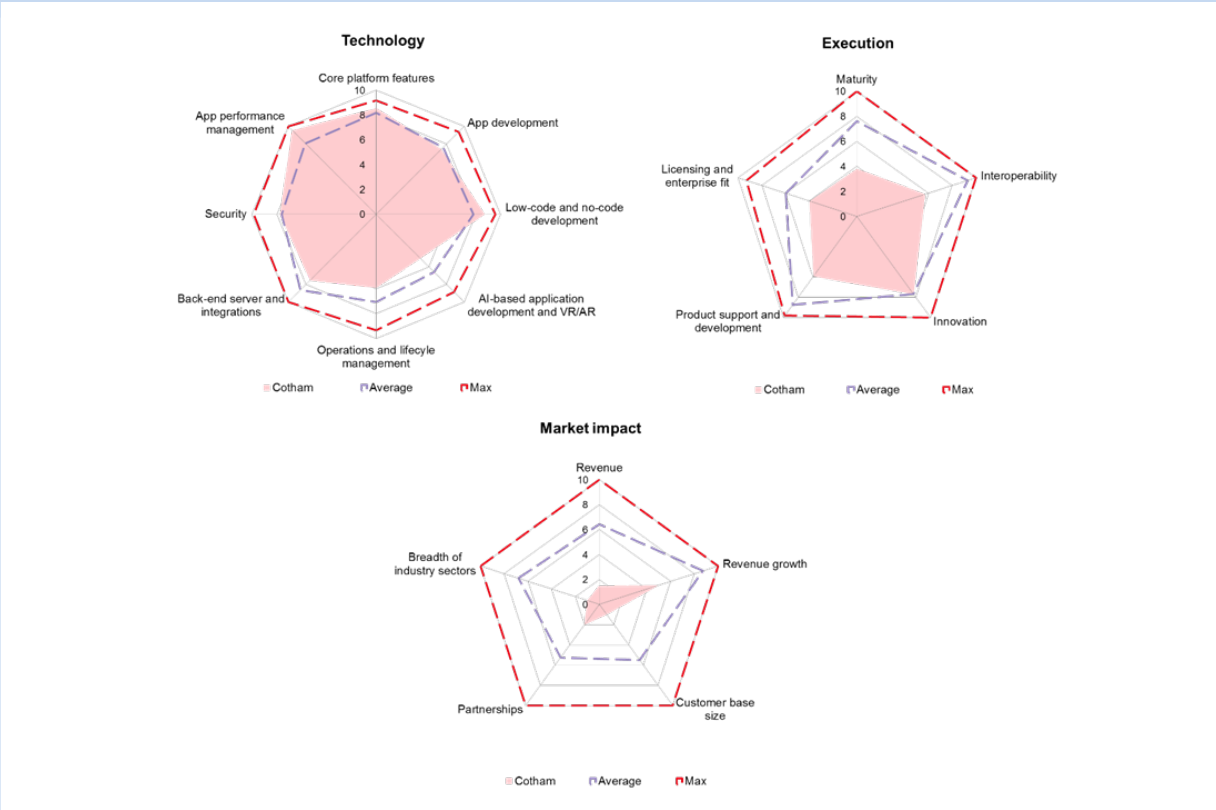
Threats

DIY IaaS

The ability to take care of back-end services and server deployment on a client's behalf certainly reduces the potential pitfalls of MADP for a client. However, the requirement will diminish if enterprise customers move more workloads to public cloud providers such as AWS, Microsoft Azure, and Google Cloud. By sending more mobile workloads to be offered via their infrastructures could result in more enterprises building applications in house.

DIY apps and open source frameworks

A similar threat is the emergence of low-code platforms and open source frameworks. Removing the need to develop solutions in the IT department threatens Axway's business model because IT departments will enable LOB managers to develop mobile and web applications by themselves. The relative ease of use could result in Axway not being a preferred option for organizations that are looking to empower both developers and LOBs with app development capabilities. Axway should focus on developing its front-end solutions so that it offers a seamless process from the customer touchpoint to the enterprise systems of record.

Cotham Technologies (Ovum recommendation: Follower)

Figure 10: Cotham Technologies radar diagrams

Source: Ovum

Products

FloPro v1.1

ODM analysis

The speed with which solutions can be created means Cotham can help organizations accelerate their mobile development strategy. Power users can work alongside end users and stakeholders, discover business requirements, and rapidly develop prototypes. The solution uses functional blocks that can be connected to create workflows. It also uses connectors to back-end systems, dramatically reducing the development time. The creation of the UI and the UX can be achieved quickly.

Cotham also supports omnichannel strategies whereby IoT devices and IoT management platforms can be plugged into the solution. Coupled with the mobile back-end services and API management, Cotham is able to provide enterprise clients with an end-to-end native mobile solution.

Cotham performed well in the ODM technology dimension but lost points in the other dimensions due to the product being so new to the market.

Strengths

Speed of no-code development

The metadata-driven development model and tablet-based IDE enable the FloPro platform to reduce mobile app development cycles. This no-code approach will fit the needs of both LOB users and developers, and furthermore, by designing apps on a tablet, users can develop apps in a more agile

manner as solutions are built and modified in real time on the fly. Unlike low-code solutions, this no-code approach is very much aimed at non-programmers representing a larger user base. Custom function blocks can be created by professional programmers if necessary.

Ease of integration with back-end systems, data sources, and IoT devices

FloPro's IDE provides the capability to map back-end message requests, incorporate visual elements in the solution, and connect with location, IoT, payment, and social media applications. With the connections to IoT devices and payment systems, Cotham can deliver an omnichannel environment for clients.

Single development model for Android and iOS target devices

Cotham has patented technology for its core software engine upon which the no-code system has been developed, building a single model for any target device. Target device OSs Android and iOS cover most of the mobile market. At the time of writing, the development environment is only on iOS iPad, as an initial choice; however, the roadmap for later in 2018 is to extend to Android-hosted development. In addition, a hosted web version accessible from any browser-based system is on the roadmap.

Weaknesses

Single use only

From a DevOps perspective, FloPro does not currently support multiple parallel users working on a project (although multiple users are supported in serial). This is on the 2018 roadmap. Until available, this could be restrictive for enterprise deals where development teams often work on the same instance of an app. However, it is recognized that the use case in LOB is often individual users rather than team-level resourcing.

Lacks third-party extensions

The FloPro product today does not have a mechanism to enable third parties to extend to it and add new functional software blocks and capabilities (beyond those accessed via open API). This will result in Cotham being a resource that IT departments farm out to end users rather than use themselves. In 2018, Cotham plans to add an SDK to its product lineup.

Opportunities

Add more sophisticated capabilities

Cotham has developed the FloPro platform to a stage where the no-code model matches customers' requirements to deliver a superior customer experience via chatbots and incorporate contemporary technologies such as Blockchain into their solutions. The FloPro platform is well positioned to meet clients' current and future requirements.

Vendor plug-ins

The next phase of Cotham's development will be to demonstrate that the FloPro platform can not only deliver an omnichannel experience with regard to customer touchpoints but also integrate with an enterprise's major applications from vendors such as SAP, Microsoft, Amazon, and Oracle. These relationships are in the pipeline, and when in place will increase the company's footprint within the enterprise and its overall addressable market.
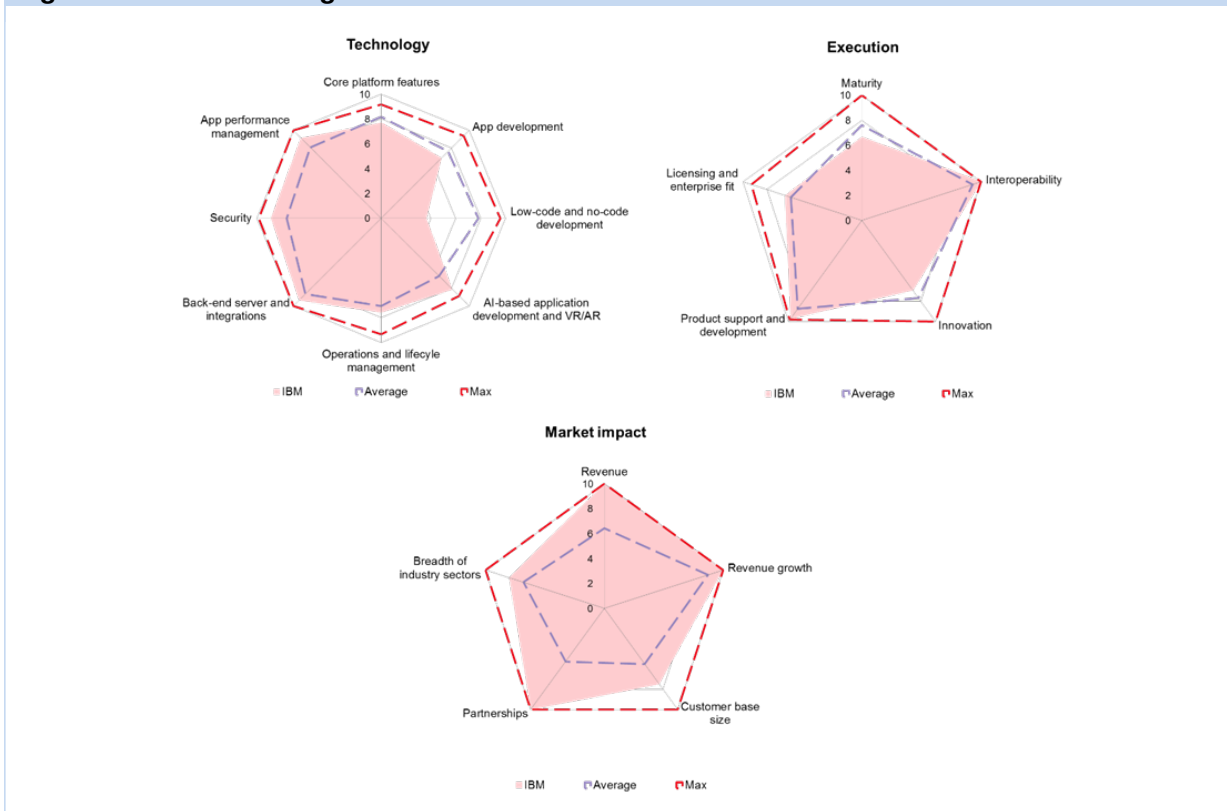
Threats

Native apps lose their appeal

Enterprise customers may switch from native apps if hybrid mobile application technology and progressive web app technology can achieve parity in terms of user experience, performance, access to device capabilities, and security. The debate of native versus open web standards versus hybrid has been ongoing for some years. Given the agile/DevOps pace of innovation stemming from Apple and Google, their OSs have in recent years been ahead of the Web Standards Project's ability to keep up. The fragmentation of the mobile market by iOS has reduced, with Android and iOS being clear winners, so Cotham has made a sensible strategic decision for the current market.

No-code approach is a cultural challenge

Ovum believes the current vogue for low-code/no-code approaches is being driven by LOB demands and IT departments' lack of ability to satisfy such demands, especially for smaller-ticket projects. However, there may still be a cultural challenge to overcome and an educational element to get across to the target market for growth in this sector of mobile development.

IBM (Ovum recommendation: Challenger)

Figure 11: IBM radar diagrams

Source: Ovum

Products

IBM Mobile comprising: IBM Mobile Foundation and IBM Mobile services on Bluemix

ODM analysis

IBM has chosen to buck the current trend by not offering its own LCNC systems, and is instead focused on its core strength of enterprise-scale mobile solutions, which it can leverage through several channels: Cloud, global IT services, and vertical-specific engagements. Its latest-generation solution is designed to let developers chose their front-end framework, such as Ionic, Swift, or Android. This also offers the freedom to work with visual drag-and-drop frameworks, such as Ionic Creator, as well as with partners such as Mendix that can offer low-code solutions.

As expected, IBM's MBaaS is a solid offering that can be hosted on a multitenant cloud with auto-scale, auto-provision, and geo-load balancing, with features such as Push, Mobile Analytics, and App Launch for controlling feature rollout.

IBM Mobile includes IBM Cloud services such as Watson speech, image and natural language processing, weather, and video services. These services enable users to create applications that can learn and adapt to each client and each experience. Furthermore, IBM Mobile is looking to deliver an omnichannel experience, delivering personalization and engaging and cognitive experiences.

IBM Mobile is releasing a new beta service called App Launch, which empowers app owners and developers to control the reach and rollout of new features to select user segments, measure defined metrics, and obtain smart recommendations.

IBM ranks with the leaders in the performance of its solution in the ODM, and is only classed as challenger due to its chosen policy of using a third-party tool to fulfill the LCND functionality.

Strengths

Cognitive services via Watson are IBM's ace card in its MADP solution

While many other players in the MADP market are still researching their machine-learning capabilities or partnering with providers, including using IBM Watson, IBM can open its full Watson feature set to its MADP. IBM is one of the leading AI technology vendors, and although the market is beginning to catch up with Watson, it remains a state-of-the-art AI offering.

Fit with enterprise-grade requirements

IBM can deliver applications on-premises, via cloud, or a hybrid. In addition, the applications can be readily integrated with back-end applications. IBM's core strength is in large enterprise systems with comprehensive security, app lifecycle management, analytics, back-end integration, push and offline sync, and more, to create modern mobile experiences with speed, security, and high performance.

The recent App Launch beta service enables app owners and developers to control the reach and rollout of new features to select user segments, measure defined metrics, and obtain smart recommendations to maximize the app experience.

Seamless cloud deployment options

Developers can deploy their mobile apps on-premises, via private clouds, and via public clouds, with hybrid options for moving apps across boundaries. Coupled with cloud-native DevOps deployment options, apps can be deployed rapidly and connect to back-end systems and applications, including connecting with containerized microservices.

Vertical specialism comes out of the box

IBM has vast experience to draw on for creating vertical solutions. It can also offer omnichannel features in its mobile apps wherever the end user interacts with the apps. IBM Mobile has over 3,000 paying clients spanning a wide variety of industries: Banking, finance, insurance, communications, telecoms, education, energy and utilities, government, healthcare, manufacturing, media and entertainment, retail, transportation and logistics, and more. Building on this client base, it can offer vertical-specific app templates.

Weaknesses

Leaving low-code activities to partners

IBM recently retired its rapid mobile app development (RMAD) functionality, Mobile App Builder, in favor of letting its partners continue to innovate in the low-code space. This leaves it to focus on enhancing its high-productivity, developer-oriented features, such as IBM Cloud Developer Console, Ready Apps, and support for rich hybrid frameworks. Ovum sees the low-code space expanding, and it is possible that IBM may acquire to round out this side of its portfolio.

Lack of a mobile app testing environment

IBM Mobile clients have expressed interest in cloud-based mobile device testing solutions. While several specialized mobile app testing services exist, including crowdsourced services, being able to test from within the MADP solution is clearly attractive, and there are plenty of open source tools to draw on. Furthermore, there is no in-built backup facility for developers, but this may not be an issue for enterprise developers, who will typically make use of application lifecycle management tools.

No marketplace for apps

Given IBM Cloud, it is surprising that no marketplace for apps – an app store – has been set up for developers to sell their complete applications. While there is a marketplace for components, the extension to complete apps is missing and would be useful for the user community. IBM Global Business Services (GBS) does feature a marketplace for complete apps, with offerings for various verticals.

Opportunities

Maximizing the app experience

IBM Mobile enables clients to take advantage of IBM Cloud services (such as Watson speech, image and natural language processing, weather, and video services) to deliver apps with powerful analytical capabilities.

Cloud-native lifecycle integration on IBM Cloud

IBM could provide full cloud-native lifecycle support on IBM Cloud. Although several pieces are in place, integration with IBM Mobile can be further enhanced, and we understand that this is on the roadmap. The use of microservices, containers, and serverless computing will affect mobile apps, as back-end systems become modernized. This could give IBM a useful additional strength.

Threats

LCNC

IBM has left the LCNC environment to others, but the traditional enterprise customer for IBM might consider these other approaches good enough, reducing the company's addressable market. As mentioned, IBM may view an acquisition as the best way to fill this gap, beyond its partnering
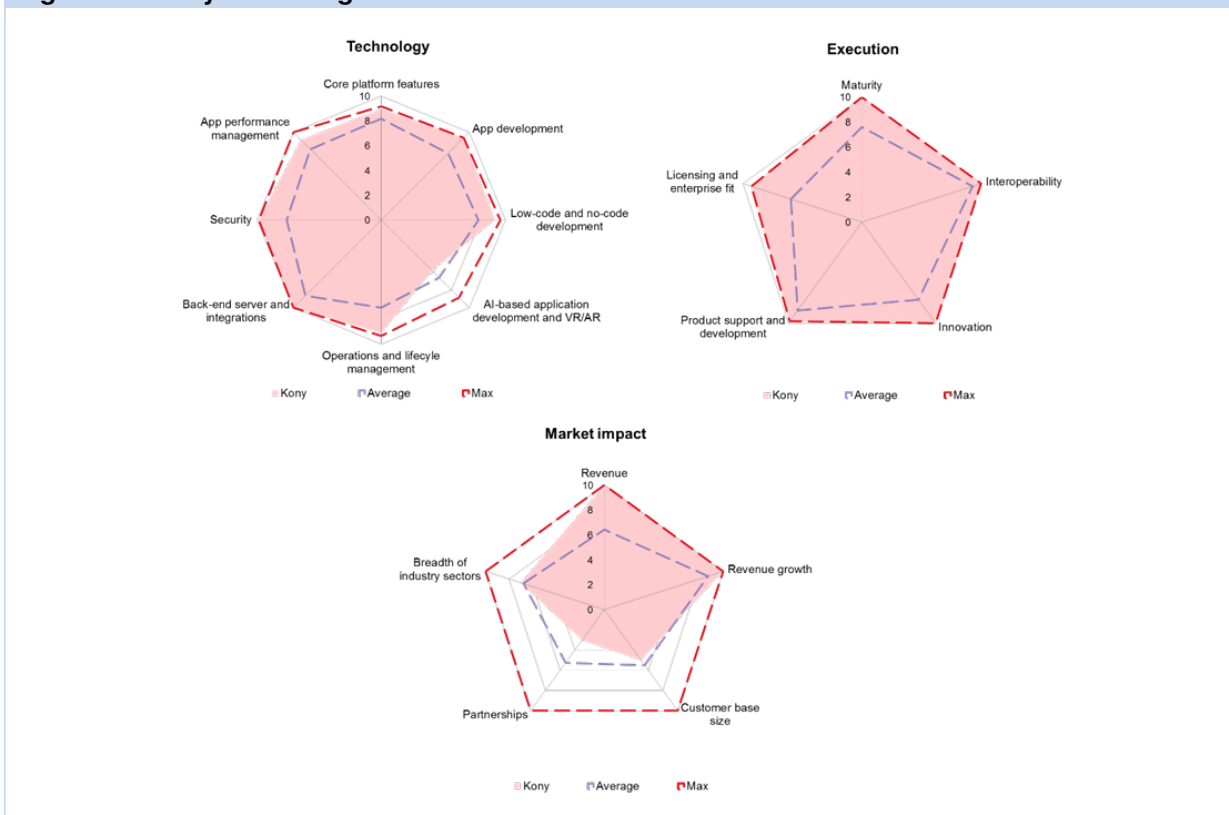
strategy. In any case, we see the users for LCNC as distinct from professional developers and working in separate departments (the former in LOB and the latter in IT) so it is likely that enterprises will adopt both types of solutions and that they are not mutually exclusive.

Time to deployment may be an impediment to AI adoption

IBM Watson offers "turnkey" mobile starter kits, such as Watson Visual Recognition, Watson Chatbot, Watson Language, and Watson Tone Analyzer, which will help accelerate AI use. Developers wishing to build custom AI solutions will desire enhanced ease of use, with fast concept to production, and tooling to support this is worth considering in helping to grow adoption of AI services. Given that the AI space is a key play by IBM, this is a threat to address.

Kony (Ovum recommendation: Leader)

Figure 12: Kony radar diagrams

Source: Ovum

Products

Kony AppPlatform v8

ODM analysis

Kony's go-to-market strategy is clearly articulated. Its propositions address three distinct areas: New businesses in this area that want to buy a turnkey app (AppVantage), more advanced businesses that want the ability to both create and manage the apps (AppPlatform), and businesses that want full DevOps capabilities for a high degree of software development lifecycle automation for app creation and app management (AppFactory). In addition to delivering these capabilities, Kony also provides consultancy expertise if needed to help the enterprise with its digital transformation strategy.

AppPlatform 8 enables users to quickly design and deliver apps in a single click to phones, tablets, and desktops from a single code base. Kony says the drag-and-drop, reusable widgets mean that apps need 50% less code than traditional tools. Kony also provides back-end services (mobile backend-as-a-service) spanning integration, authentication, push messaging, and offline data synchronization via thousands of prebuilt RESTful APIs and more than 100 data connectors.

It should be noted, however, that AppPlatform 8 lacks an end-user testing platform without the purchase of Kony AppFactory, which relies on AWS Device Farm and Appium for on-device testing. It uses JavaScript as a common omnichannel development language and does not enable customers to code in either PHP or Python. In terms of machine learning capabilities, AppPlatform 8 does not have algorithm and data tool libraries built in, but provides connectors, components, and samples that integrate with AWS ML library, IBM Watson, Microsoft Bot Framework, Apache Spark, and Google TensorFlow. Kony's CTO Lab will be working on closing these gaps in the tooling in future versions.

The company's partner network provides vertical expertise, including an OEM agreement with banking and retail specialist Diebold Nixdorf, and expertise outside of MADP through global SIs such as Accenture, Wipro, and Cognizant, and regional coverage with AT&T, Softbank, and TechData.

Kony is the top performer in the ODM MADP and excels in all three dimensions of technology, execution, and market impact.

Strengths

Ease of design coupled with speed of deployment

Kony's Marketplace, which contains more than 100 components and templates, provides both designers and developers with turnkey solutions for creating mobile apps. These include simple drag-and-drop tooling or backend services allied with analytics. The apps can be deployed seamlessly to mobile devices, web, and wearables, as well retail kiosks.

Client base spread across many consumer-focused verticals

Kony's client roster includes innovative companies in several verticals, including financial services (Partners Federal Credit Union), healthcare (EASE Applications), manufacturing (KMC Controls), retail (Localiza), and utilities (Engie).

Kony Nitro Engine offers advanced omni-channel capabilities

The Kony AppPlatform uses the embedded Kony Nitro Engine to achieve a seamless end-user experience across multiple channels, including phones, tablets, kiosks, IoT, laptops, and more, with options of 100% native, web, and hybrid apps. Kony has patents protecting this technology and can also offer SLA guarantees and an extensive omnichannel API framework, making this highly attractive to enterprise customers.

Comprehensive training programs

Kony provides various training and certification programs designed to extend the benefits of Kony's platform and applications. The Kony AppPlayground introduces developers to the Kony platform (online or in person), and the Kony Base Camp community includes a training program with accreditation where successful participants earn badges.

Weaknesses

Historically focused on MADP

While Kony has expertise in delivering a client's omnichannel experience, it does not include end-to-end testing without the addition of the Kony AppFactory offering. In addition, because it lacks a footprint elsewhere in a company, cross-selling opportunities are limited. However, Kony has been investing in an expanding portfolio of AppVantage industry solutions and prebuilt apps that will enable it to cross-sell more easily into LOB groups other than IT. While this is not normally a weakness in a market with many similar dedicated vendors, it creates a challenge where competitors are large IT vendors. The counter-argument is that for Kony to succeed in such a market, it must excel to achieve recognition.

Emerging machine learning features

Artificial intelligence in the form of machine learning (ML) is the new wave in application development.Kony's solutions do not include built-in algorithm and data tool libraries for ML-based app development, and it only offers prebuilt components and connectors to third-party ML providers. Companies are looking to mobile apps to be a component of their AI strategies, so lacking the built-in capability reduces Kony's addressable market. Kony is working with partners to fill out this capability, and has deeper ML features on its roadmap, with development experience already gained in its CTO Lab.

Low deal value

Kony's weaknesses reduce its scope to increase its initial average contract value. Average contract values can increase over time as clients expand their portfolio of digital apps and standardize on a platform across the enterprise. Nevertheless, mobile strategy is key to digital transformation and Kony has ridden this wave against tough competition. Mobile will also continue to be a prominent part of IT strategy.

Opportunities

Engage with the business

The low-code model enables Kony to engage with end users in the business and attune Kony's apps with their business processes. This could open up vertical specialisms, which are already seen in Kony's banking applications and AppVantage industry solutions, and provide an opportunity for Kony to accelerate its footprint in existing as well as new industry sectors such as healthcare, retail, and energy.

Dedicated innovation group

Software developers and professional service engineers in Kony CTO Labs are focused on innovation and are a critical resource in enabling Kony to incorporate AI, analytics, and future digital experiences into its applications. The engineers are already working on adding natural language processing, speech, visual recognition, ML, blockchain, and gamification to applications.

Threats

Kony is squeezed out

Kony risks being squeezed out by its partners and other software providers. Systems integrators such as Accenture, Wipro, and Cognizant could develop their own low-code mobile apps deemed "good enough" for enterprise clients. In addition, companies already embedded in organizations' workflows,
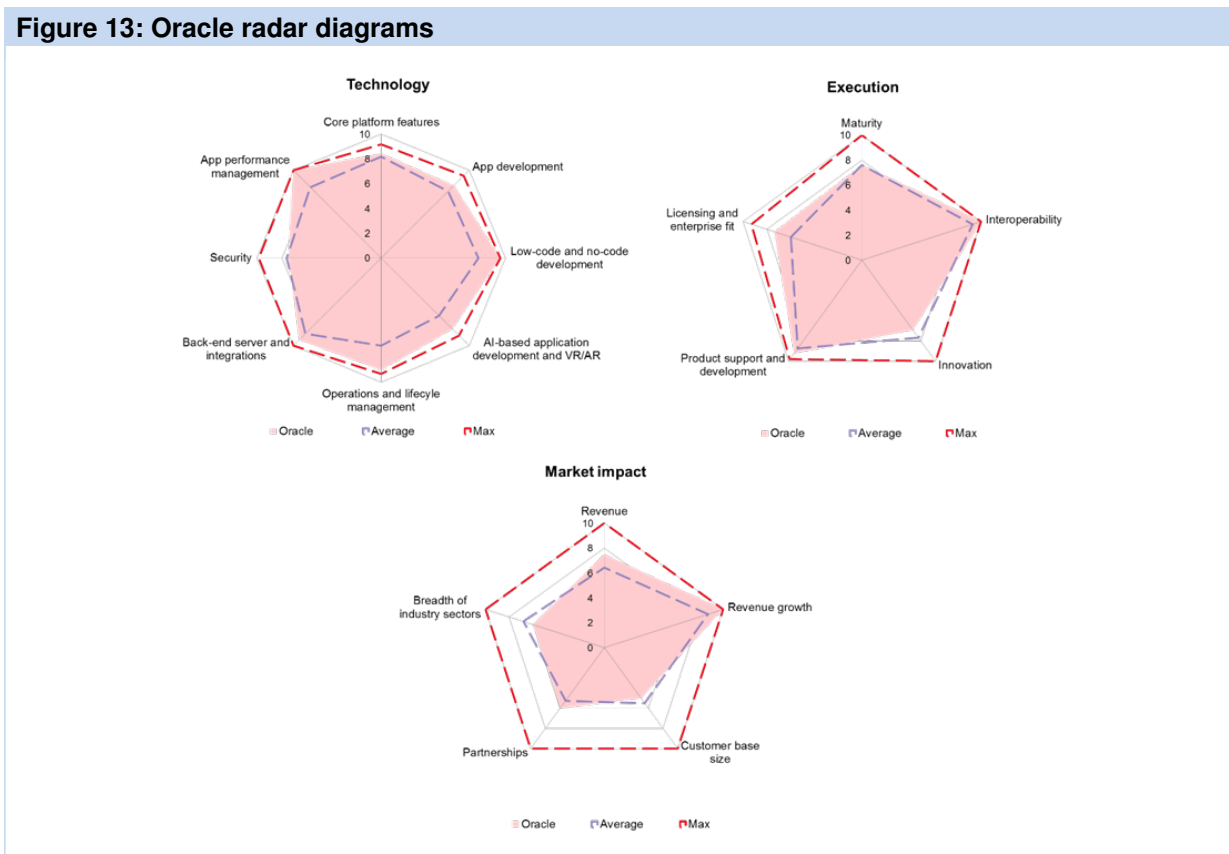
such as Salesforce and SAP, are in direct competition with their own mobile offerings and can negotiate an extension to clients' current installations. Kony has been able to keep one step ahead of this competition so far, but with AI becoming a major play, Kony needs to ensure its AI roadmap is on schedule.

Clients take a DIY approach

In the future, clients might choose to buy apps from marketplaces that are simple enough to implement straight out of the box. The build-your-own sector is often the major competitor to platform solutions such as Kony's, but there are considerable hidden costs and risks involved around the maintenance of these apps. With the trend moving toward low-code and ease-of-use solutions, Kony should be able to win the debate when talking to prospects. Kony's move to offer prebuilt apps will also help mitigate this issue by reducing TCO while still offering the flexibility of a highly customizable solution.

Oracle (Ovum recommendation: Leader)

Figure 13: Oracle radar diagrams

Source: Ovum

Products

Oracle Mobile Cloud

ODM analysis

Oracle Mobile Cloud provides an end-to-end MADP platform for building client-facing experiences with mobile client developer tools. Functioning as a MBaaS, the platform caters for JavaScript developers and also provides low-code/no-code tools for non-developers to build mobile applications.

Analytics is integrated across multiple channels. For example, customer experience analytics provides information about who is using which channels and how, helping to capture use cases, such as customer preferences regarding the use of mobile versus bots. This service started in 2015 and now has more than 700 customers. The mobile back-end-as-a-service, or mobile app integration, connects to multiple sources, from systems of record to REST APIs.

Onboarding is made easy, with all tools free to download and try. Payment is by Oracle's Universal Credit Model (UCM), where each service has a rate card based on requests per hour.

Oracle is already in a position to help enterprise customers create mobile apps that incorporate bots, wearables, and mobile devices on a consistent platform, supported by the customer experience analytics components that gather insight on usage, adoption, and experience.

In terms of support, Oracle provides users with documentation, videos, and implementation blogs and developer-focused presentations and hands-on training at various industry events and hackathons. However, unlike other vendors, Oracle does not offer a free-to-use version of the platform to enable new customers to get a taster, nor does it offer consulting services to embed the solutions, leaving that to its system integrator partners.

Oracle performed as a worthy leader in the ODM, with above average scoring in all three categories of technology, execution, and market impact.

Strengths

Seamless platform for all users

Oracle Mobile Cloud Services fits the requirements of both enterprise developers and LOB decision-makers by providing developer tools such as CI/CD tooling, debug tools, and complete platform diagnostics as well as low-code and no-code developer tools. Customers can use a single platform without a high learning curve that can deliver an omnichannel experience that includes immediate support for chatbots. The platform also supports many coding languages.

Offline synchronization using entity tags (ETags)

An important feature of Oracle's solution is its offline synchronization, which goes beyond traditional database synchronization by using the ETag concept. No data is stored on the Oracle cloud, and is held either on the mobile device or in a system of record. An ETag carries a time-stamped signature of the data, and the user can select REST-based offline caching on the mobile device for later synchronization. The ETags help with conflict resolution in complex transaction environments. The REST data is also "shaped" for mobile compared, leading to better performance.

Oracle AI is made easy to consume by mobile apps

AI is recognized as an important technology, and this capability has been developed organically within Oracle for some years. Oracle's approach is to make it easily integrated into mobile apps for advanced applications. Oracle already has 10 referenceable customer chatbot apps to demonstrate its technology.

Weaknesses

Need to change perceptions

Oracle is not a company that is readily associated with AI and will need to do more to educate enterprise customers of its expertise in this space. Oracle has changed perceptions by offering its applications via the cloud, and will need to go through a similar exercise to convince enterprise buyers

of its credentials in the fast-evolving AI market. The priority should be to encourage systems integrators to use its Intelligent Bots to generate case studies and gain market traction. The company will face similar challenges when it introduces solutions for mobile augmented reality.

Opportunities

Chatbots become mainstream

Oracle is well placed to take advantage of the MADP marketplace where chatbots are becoming the norm for many customer interactions. Having a chatbot platform powered by AI will be looked upon favorably by both enterprise and SMB clients. Some of the AI technology, such as voice recognition, is now standard from providers such as Apple with Siri and Android with Google Voice, and Oracle seamlessly integrates with these services. Furthermore, Oracle's heritage in the back office means that it will be well placed to help clients integrate the data emanating from the apps into the systems of record.

Integrating with third-party AI solutions

Just as Oracle has made its client-side tooling policy-agnostic, it might win more customers by also making its AI choices agnostic through integration with third-party AI solutions. Already it chooses existing technologies, such as natural language processing from the mobile OS providers. Decoupling the app platform from the AI systems will give enterprise buyers an already-chosen AI platform with the freedom to use it in their mobile development.
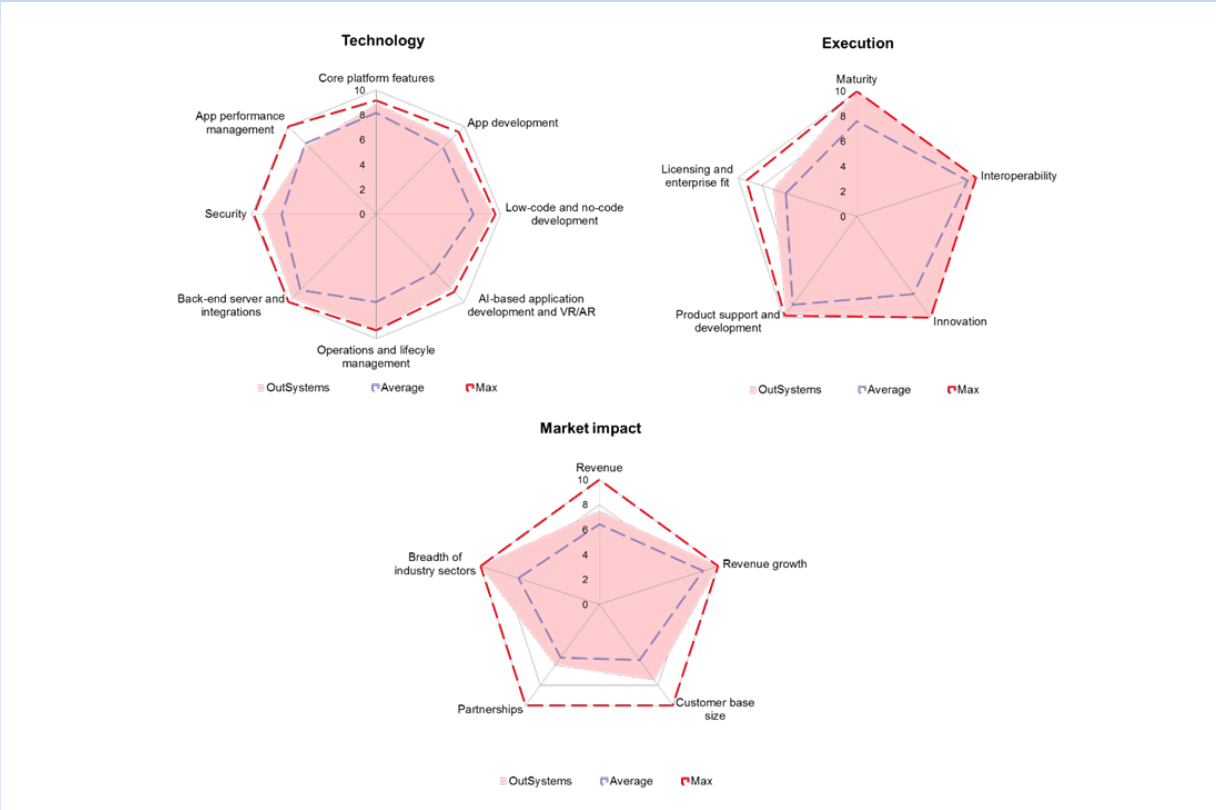
Threats

Squeezed out by SIs

Not providing any consulting services makes Oracle unable to get a deep understanding of customer requirements and means it is reliant on systems integrators to correctly position its solutions. Furthermore, because the company is not known for its AI capabilities, it could be passed over by enterprise buyers, or not promoted by SIs. The company needs to remedy the situation of its AI capabilities being its best kept secret.

OutSystems (Ovum recommendation: Leader)

Figure 14: OutSystems radar diagrams

Source: Ovum

Products

OutSystems, Platform 10

ODM analysis

OutSystems supports organizations by enabling them to create new mobile workforce apps, employee portals, workflow apps, and operational dashboards. The platform aims to enable fast visual development, easy integration, and solid scalability of apps and workflows. OutSystems also offers a marketplace called Forge, which product partners use to publish their solutions and thousands of other components. In addition to these design capabilities, user experiences can be optimized, and security and governance practices are automatically enforced for every app built using the platform, instead of depending on implementation practices from each developer. The platform also integrates with corporate identity management systems.

To meet the needs of organizations with more sophisticated requirements, OutSystems works with an extensive partner network. By partnering with global SIs, including Atos, Cognizant, CapGemini, Deloitte, KPMG, and PwC, OutSystems can provide specialist vertical expertise in how the insurance, financial services, retail, and energy sectors use the platform. Its product partners include CoolProfs, Conclusion BAM, DB Results, Transfer Solutions, Noesis, and Infosistema.

The development of new apps and solutions and the availability of technical talent that can help to create apps are key challenges faced by organizations looking to successfully execute a digital transformation initiative. By offering a platform that helps to empower people with low-code

development capabilities, and by developing good partnerships that offer vertically aligned solutions, OutSystems is well positioned to support organizations in overcoming these challenges.

In terms of research and development (R&D), OutSystems is focusing on embedding AI in its public applications, such as, for example, for chatbots and voice controls, as well ensuring that its AI initiatives tie in with the endeavors of infrastructure providers such as AWS and software providers such as SAP and Microsoft.

OutSystems scored as a high-performing leader in our ODM across all the dimensions of technology, execution, and market impact.

Strengths

OutSystems provides low-code solutions with advanced features

OutSystems addresses the need for simple solutions that bely sophisticated technologies, such as AI. More importantly, with OutSystems, the user does not need to touch the underlying code. The low-code approach, allied with advanced AI capabilities, means that developers can shorten development cycles and get apps in front of users quickly. Any app developed using visual capabilities can also be extended with standard HTML, JavaScript, and CSS. Native device capabilities, such as the camera, calendar, or GPS, can also be accessed when developing apps by creating simple plugins. The relative simplicity in the platform's design also means that SIs can easily implement the platform.

It covers both development and delivery

Developers use a single IDE that covers the entire development lifecycle, which is backed up by OutSystems' automated cloud DevOps (available to all customers), which embeds the mobile app in customer organizations. Because AI systems need "training", it is critical that suppliers ensure that their clients are maximizing the benefit of such systems, otherwise the platform will be blamed when projects do not deliver, rather than the underlying data and/or data governance processes.

Weaknesses

The mobile games market is not a priority

The mobile games market is a significant one, but not one on which OutSystems is focused. It appeals instead to large enterprise accounts that need rapid development and deployment and have a minimal set of development skills (but strong business domain knowledge) among end users, which is typical with LOB users. Although this focus has enabled OutSystems to become a leader in the MADP market, it is missing out on the huge mobile games market.

Client-side app performance monitoring capabilities are not as strong as those in some peer offerings

Enterprise MADP solutions exist in a highly competitive space, and vendors enhance their capability with client-side app performance management functionality. OutSystems, while demonstrating many leading capabilities, is not as strong in this respect as some other solutions. In particular, Android-, iOS-, and Windows-specific app performance monitoring capabilities are currently lacking. Integrating app performance monitoring in a development tool is a useful feature for modern enterprises that run and support multiple OSs.

Opportunities

Further development of the partner network and engagement is important

OutSystems is looking to expand the share of channel revenues by increasing the number and depth of relationships with global SIs, regional SIs, and product partners, and to expand its customer engagement by offering professional services expertise. To avoid lock-in, being partner-agnostic and widening the pool of partners will be important.

Integrators are its key route to market

The OutSystems platform has been focused on partnering with SIs to plug in their solution, rather than on independent software developers to create mobile apps themselves. OutSystems is positioned to be an out-of-the box solution rather than a platform that underpins solutions. This means that retaining and growing its ecosystem of partners is critical to its future success.

Threats

The rising popularity of no-code solutions could threaten the appeal of low-code solutions

With low-code/no-code solutions becoming more popular, OutSystems may find tougher competition in the market as other players want a stake. Furthermore, although users with limited development experience can use low-code development platforms, the barriers to entry around pure no-code solutions are lower. If the market evolves and more widely accepts and adopts pure no-code solutions, this would limit the appeal and market traction of low-code tools. For OutSystems, which positions itself in the low-code category, this could be a potential threat.

Salesforce (Ovum recommendation: Leader)

Figure 15: Salesforce radar diagrams

Source: Ovum

Products

Salesforce Mobile

ODM analysis

By offering visual development functionality alongside SDKs for more professional developer use, Salesforce Mobile can enable both experienced developers and those not well-versed in traditional app development practices and techniques to create apps. Visual, low-code app development is nothing new, but Salesforce's strength here is in the enriched and extensive ecosystem of components that customers can leverage when developing apps via the Lightning App Builder. This ecosystem consists of core components provided by Salesforce, as well as the company's network of partners, which includes Deloitte, Accenture, and Wipro, and Salesforce customers that have created and shared their own custom components. Salesforce's approach to low-code development aims to democratize the app development process, enabling more people to build apps and solutions regardless of skill or experience. This approach will not only empower more employees, but will also help to relieve some of the development pressures placed on more traditional IT development teams, particularly as demands on these resources increase.

Salesforce has also invested heavily in AI under the banner of Einstein. Einstein's capabilities are platform-wide and are being introduced to the company's SDKs, ensuring that Salesforce's offerings can increasingly incorporate AI.

There are currently more than 3 million developers and 150 active user groups worldwide. Supporting organizations in the democratization of app development will require not only capable technology, but also engaging learning mechanisms and programs. Salesforce offers a learning program by way of Trailhead, which offers both modules and engaging gamification elements that help to develop communities and support members in developing their skills and status. Trailhead could prove to be a very important and valuable program for Salesforce, especially in how it can help people to learn more about how to develop business solutions and apps. This could ultimately help enterprises to optimize the use of any development solution and increase return on investment.

Salesforce Mobile ranked as leader in our analysis and scored well all round, only losing a few points in the Execution dimension to some of the other leaders.

Strengths

An addressable market beyond its CRM footprint

Salesforce's extensive CRM footprint provides it with a different avenue into enterprises compared to some of its MADP competitors. A Salesforce deployment is often the hub for data in an organization. The company's strategy of providing pre-built components available from the AppExchange, coupled with connectivity with the customer data, means that projects can move quickly from design to delivery, and apps have a large repository of valuable data to easily tap into. Customers can deploy the Salesforce Mobile platform quickly and be confident that it will successfully integrate with the back-end systems, due to the company's heritage in that space.

An engaged user base backed up by strong partnerships

Salesforce recognizes that to ensure that customers get the maximum ROI, supporting them in optimizing utilization is important. The Trailhead online learning environment is a key resource, not only in enabling users to become knowledgeable about the platform, but also in driving user engagement, as learners can earn badges and promote their new proficiencies on LinkedIn. Salesforce states that the Trailblazer Online community has been very successful, attracting 3 million members so far. Furthermore, AppExchange has over 4,000 solutions and 5 million installs recorded, meaning that Salesforce has an engaged user base that will enable the firm to build brand equity and customer loyalty. In addition to providing ongoing support, an engaged user group can be a useful source of information on how user requirements are changing, enabling Salesforce's research and development teams to be ahead of the competition.

Weaknesses

On-premises deployments

Salesforce delivers its MADP functionality solely via the cloud. Although enterprise customers are becoming more comfortable deploying cloud applications, some apps remain unsuitable for security or legislative reasons, such as in the financial services market. Customers who are restricted to on-premises applications are not part of the company's addressable market.

Opportunities

Einstein-based applications

Increasingly sophisticated applications will continue to be offered on the AppExchange as a result of the company's investments in AI R&D activities and through innovative developments by customers and partners. This traction will mean Salesforce will be well placed to meet the needs of customers to

automate processes and make sense of disparate data sets residing in their CRM and other back-end systems.

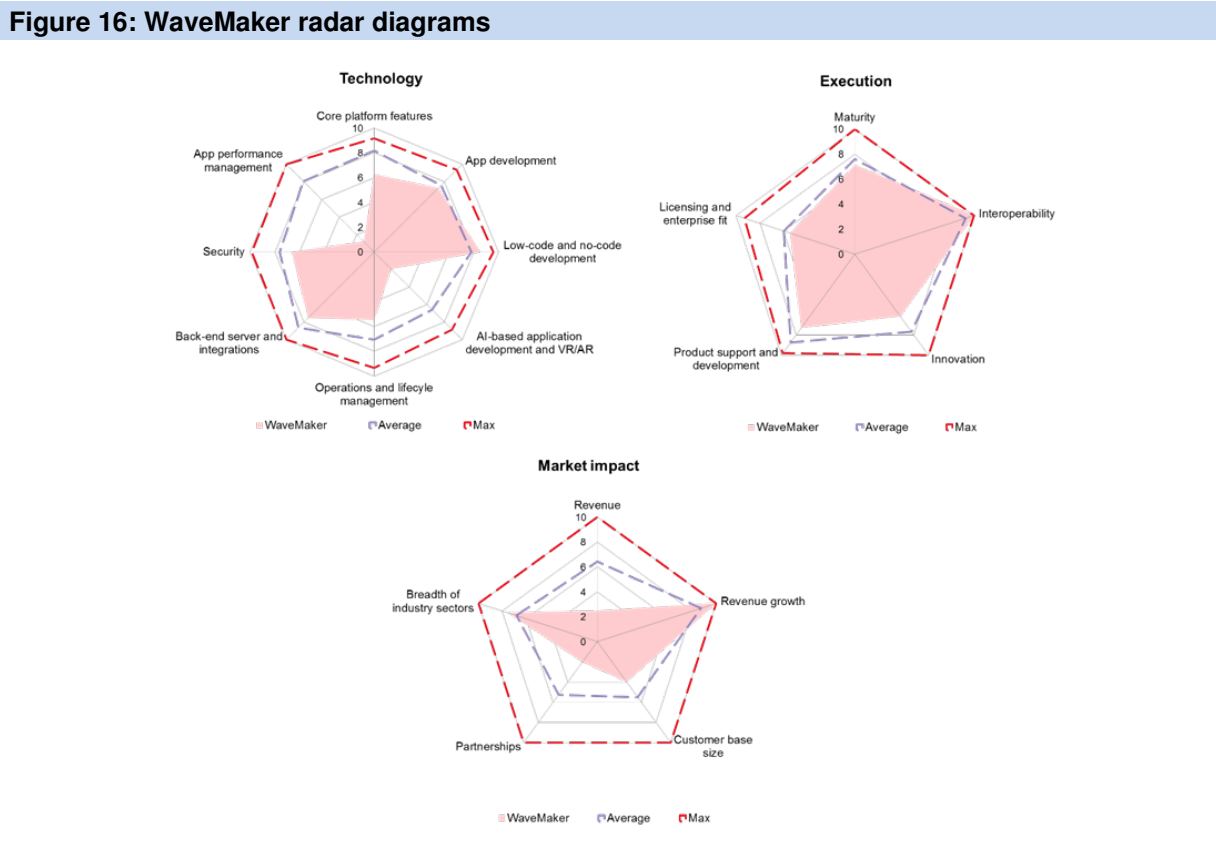*Going beyond data in customer engagements*

Although Salesforce can act as a firm's custodian of data, the company can deliver more value than this to enterprise customers. Salesforce can offer firms the capability to mine their data to provide data insights, and it also offers, by itself or in partnerships, consulting and professional services on the back of data-centric engagements.

Threats

The lack of business understanding of the value of enhanced application capabilities

New technologies and capabilities are constantly disrupting how organizations operate, presenting both opportunities and challenges. Understanding how new capabilities such as AI and machine learning can be used in a way that resonates can be challenging for organizations, but it is important in driving utilization and gaining an ROI. Salesforce will need to emphasize the end-to-end nature and value of its applications. Additionally, it must be able to demonstrate how capabilities such as Einstein can be valuable in a context that resonates with businesses across different industries. The Trailhead community certainly has the potential to help in this.

WaveMaker (Ovum recommendation: Follower)

Figure 16: WaveMaker radar diagrams

Source: Ovum

Products

WaveMaker Rapid 9.0

ODM analysis

Rapid 9.0 offers developers a straightforward framework and good set of capabilities for developing and deploying mobile and web apps. The company can call on more than 20,000 developers as well as a large development community that underpins the APIs. The API-first approach enables developers to plug in their preferred applications out of the box, and choose from WaveMaker 's selection of plug-in widgets, including Cordova plugins tailored to individual devices. Furthermore, because WaveMaker is not wedded to a deployment model, the platform can be used as either on-premises or as a SaaS application.

Because Rapid 9.0 lacks some of the sophistication of other vendor offerings, WaveMaker is reliant on partners for implementation. Specifically, Rapid 9.0 lacks marketplaces for apps and components and machine learning capabilities, as well as the ability to perform analytics (predictive analytics, custom dashboards and reporting, and history and trend analytics). At the time of writing, WaveMaker is developing apps based on voice control and chatbots.

WaveMaker scored well in the ODM technology dimension, only losing points for lacking AI and APM-related tooling. Its execution and market impact scoring were also good, and this solution has the potential to become a challenger in the next MADP ODM.

Strengths

Ease of deployment

WaveMaker Rapid covers the entire lifecycle of application delivery, enabling developers to create enterprise-grade mobile apps in a short space of time. Underpinning the delivery speed is the fact that WaveMaker Rapid integrates with the major PaaS providers (AWS, Microsoft Azure, and Google Cloud), and the apps themselves can be deployed to public or private clouds and are microservices-ready thanks to the company's API-first policy. Developers can create apps based on their preferred applications, then make the enterprise applications mobile ready, and deploy them quickly.

Good extensibility by way of integrations

The library of reusable widgets (for presenting charts, audio buttons) and color palettes offers developers ready-made solutions to their apps. The widgets also take advantage of the native capabilities on which they are running.

Out-of-the-box app themes and templates

WaveMaker offers out-of-the-box themes and templates that enable developers to build mobile applications. While not a differentiator, this is an important capability. These themes and templates can be further customized based on the native platform on which the Mobile Application is to be deployed (Android/IOS) by using material theme designs.

Weaknesses

Lack of stickiness

Being wedded to open standards is a double-edged sword for WaveMaker. The open standards approach provides opportunities for developers to experiment and create their own applications. However, by not locking in vendors, WaveMaker runs the risk of developers being able to easily switch to a competitor. Overall, the risk for WaveMaker is that it is perceived as tool for experimentation rather than part and parcel of the customer's business.

Lack of sophisticated tools

Not having out-of-the-box connectors/integrations for analytics and machine learning will hinder adoption of the Rapid platform. WaveMaker risks being perceived as a less sophisticated proposition when compared with other MADP vendors. The lack of analytics is a concern. If developers cannot measure and analyze performance, they won't be able to demonstrate return on investment. In addition, machine learning is becoming a standard feature of MADP platforms and a key requirement to enhance the customer experience. WaveMaker will need to catch up in this area if it is not to be prevented from bidding for new contracts.

Lack of vertical solutions

WaveMaker requires developers to have the required knowledge and experience of producing apps for their end users. A lack of ready-made solutions for a vertical market increases developers' workload and therefore the time taken to develop and deploy the apps. WaveMaker risks being squeezed out by other suppliers that can offer apps tailored to a vertical that can also be also with a drag-and-drop approach.

Opportunities

Omnichannel solutions

WaveMaker can support customers' omnichannel aspirations thanks to its investments in chatbots, voice, and IoT devices. Having the capability to integrate content from IoT devices enables WaveMaker to broaden its appeal for verticals such as utilities, while enabling clients to deploy chatbots and harness voice control will open up new opportunities to enhance clients' customer experience.

Create a marketplace for widgets

The open source developer community is a key resource for WaveMaker to tap into for expertise. The company should look to showcase the developer talent by launching a marketplace for its widgets, enabling developers to gain extra income and for WaveMaker to retain their loyalty.

Threats

Competitive market requires careful positioning

The enterprise MADP market has many solutions, and for WaveMaker to grow, it needs to fine-tune its messaging. Its strength in low-code development is a good entry to enterprise LOBs, and it should be able to compete as a no-frills alternative. However, with advanced technologies such AI chatbots now becoming a differentiator in the MADP market, WaveMaker needs to find partners to accelerate its AI/machine learning capabilities.

Vendor solution selection

Inclusion criteria

This ODM looks at the key trends, market activities, and solutions in enterprise MADP. Its aim is to help business and IT executives make informed decisions about how to build apps for mobile devices and manage the app development and production lifecycle. This will help organizations create a coherent mobile strategy. The report is aimed at C-level executives, IT managers, line-of-business

managers, and software development managers and team leaders. The criteria for inclusion of a vendor solution in this ODM comparison are as follows:

- Solution's target market is midsize to large enterprise customers, typically those with more than 1,000 employees.
- Vendor has more than 200 individual customer companies.
- Vendor does not focus on mobile application development in a single vertical industry and is not restricted to one application platform.
- Vendor solution should include support the first, second, and at least **four more core** functional areas:
- **Core MADP disciplines**:
    - **Required**: Application development environment:
        - GUI build features
        - JavaScript based development
        - Other languages and/or domain expert tools
    - **Required**: Supports cross-platform development:
        - HTML5 and open web standards
        - Hybrid development
        - Native development on Android and iOS
    - Traditional development and low code/no code development
    - Backend API and services for integration to enterprise systems
    - Application security control and monitoring
    - Support for development of apps using AI
    - Mobile end-user behavior/usage analytics
    - Cloud hosting of tools and/or apps
    - In-built application lifecycle management (ALM)
    - Mobile application performance management

Methodology

Technology/service assessment

In this assessment dimension, Ovum analysts identify features and functionality that provide differentiation between the leading solutions in the marketplace. The criteria groups identified for MADP are as follows, listing high level categories with percentage weighting:

- **Core platform features, 14%**: Solution platforms supported, target device OSs, type of apps, target form factor, browser-support, cloud user services, and license options.
- **App development, 14%**: Development environment, mobile device simulator, omni-channel capabilities, API support, messaging and communications standards, coding languages, pre-built code components, event flow management, backup support.
- **Low-code and no-code development, 13%**: Target user, development, visual development, modeling standards, skills training, pre-built model components.

- **AI based application development and VR/AR support, 10%**: Machine learning, VR/AR.

- **Operations and lifecycle management, 11%**: Push notifications, app updates over the air, administration, ALM discipline in-built, ALM external integrations, continuous integration and continuous delivery, cloud-native development, code management, agile, and DevOps.

- **Back-end server and integrations, 14%**: Back-end data support and MBaaS, mobile offline capabilities, enterprise applications support/connectors, cloud services, third-party product integrations.

- **Mobile app security, 14%**: Authentication, authorization integration, app barring, data protection, code related security, mobile application security monitoring.

- **App performance management, 10%**: Analytics, alerts, reporting, and dashboards; app performance profiling; server-side and client-side app performance monitoring.

Execution

In this dimension, we review the capability of the solution around several key areas.

- **Maturity**: The stage that the product/service is currently at in the maturity lifecycle, relating to the maturity of the overall technology/service area.

- **Interoperability**: How easily the solution/service can be integrated into the organization's operations, relative to the demand for integration for the project.

- **Innovation**: How innovation can be a key differentiator in the value that an enterprise achieves from a software or services implementation.

- **Product support and deployment**: Various deployment issues, including time, industries, services, and support.

- **Licensing and enterprise fit**: The total financial investment (solution, licensing, maintenance and support, additional hardware) expected across different scenarios. Also, the alignment of the solution with enterprise needs, and the potential ROI period.

Market impact

The global market impact of a solution is assessed in this dimension. Market Impact is measured across five categories, each of which has a maximum score of 10.

- **Revenues**: Each solution's global MADP revenues are calculated as a percentage of the market leader's. Overall global revenue carries the highest weighting in this dimension.

- **Revenue growth**: Each solution's revenue growth estimate for the next 12 months is calculated as a percentage of the growth rate of the fastest-growing solution in the market.

- **Customer base size**: A relative score is calculated against the vendor with highest customer base.

- **Partnership size**: A relative score is calculated against the vendor with the largest partnership base.

- **Vertical penetration**: A normalized value is calculated for the breadth of industry sectors penetrated by the vendor. The sectors are: Energy and utilities; financial services; healthcare; life sciences; manufacturing; media and entertainment; professional services; public sector; retail; wholesale and distribution; telecommunications; and travel, transportation, logistics, and hospitality.

Ovum ratings

- **Market leader :** This category represents the leading solutions that we believe are worthy of a place on most technology selection shortlists. The vendor has established a commanding market position with a product that is widely accepted as best of breed.
- **Market challenger :** Solutions in this category have a good market positioning and the vendor is selling and marketing the product well. The products offer competitive functionality and a good price-performance proposition, and should be considered as part of the technology selection.
- **Market follower :** Solutions in this category are typically aimed at meeting the requirements of certain customers. As a tier-1 offering, they should be explored as part of the technology selection.

Appendix

Methodology

Ovum conducted briefings with key vendors, producing a SWOT report for each one, and each key vendor completed an ODM spreadsheet with detailed questions about the three dimensions of the ODM. In addition, Ovum has drawn on its research and depth of experience in the field, across its specialist groups that cover mobile technology, to inform its analysis.

Further reading

Artificial Intelligence Technology and Applications: Ovum Definitions and Taxonomy, INT002-000069 (February 2018)

Authors

Michael Azoff, Principal Analyst

michael.azoff@ovum.com

Adam Holtby, Senior Analyst

adam.holtby@ovum.com

Michael Larner, Senior Research Associate

Ovum Consulting

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CONTACT US

ovum.informa.com

askananalyst@ovum.com

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