

# Predictive Apps Are The Next Big Thing In Customer Engagement

by Mike Gualtieri, June 25, 2013

## KEY TAKEAWAYS

### **Customers Demand That Brands Treat Them Like Royalty**

We live a world of 7 billion “me”s. Your customers increasingly expect and deserve to have a personal relationship with you and the hundreds of other brands in their lives. Companies that continuously ratchet up individualized experience will succeed. Those that don’t will be increasingly become strangers to their customers.

### **Predictive Apps Leverage Big Data Predictive Analytics**

Predictive apps are a new design paradigm: applications that leverage big data predictive analytics to anticipate and provide the right functionality and content on the right device at the right time for the right person.

### **You Need A New Design Approach To Deliver Predictive Apps**

Google cofounder Larry Page has said, “The perfect search engine understands exactly what you mean and gives you exactly what you want.” Likewise, the perfect app anticipates exactly what you will need and gives it to you. But perfection is a journey, not a destination; prediction is about probabilities and getting better as your app learns.

### **Predictive Apps Are Hard To Deliver**

Only the most driven entrepreneurs, technologists, and innovative executives will take on the development of predictive apps. They must reimagine how predictive apps can transform their digital relationship with their customers and master hyperpersonal user experience design for both mobile and embedded devices.



## Predictive Apps Are The Next Big Thing In Customer Engagement

Leverage Big Data And Predictive Analytics To Supercharge Innovation And Disrupt Your Competitors

by [Mike Gualtieri](#)

with [Mike Gilpin](#), [James L. McQuivey, Ph.D.](#), [Kyle McNabb](#), Vivian Brown, and Rowan Curran

### WHY READ THIS REPORT

The answer to developing apps that dazzle the digital consumer and making your company stand out from the competition lies in what Forrester calls “predictive apps.” Predictive apps leverage big data predictive analytics to provide the right functionality and the right content on the right device at just the right moment for the right person — an individual person, not a target, niche, or segment. This report introduces predictive apps and advises application development and delivery (AD&D) professionals on how to prepare for this new model of predictive apps — an era that will take digital disruption to its most logical and necessary extreme: a world of hyperindividual experience.

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Forrester conducted interviews, inquiries, and advisory engagements with dozens of clients and spoke with leading experts and thought leaders in innovation, predictive analytics, and software development, including practitioners and academics.

### Related Research Documents

[The Future Of Customer Data Management](#)  
March 6, 2013

[The Forrester Wave™: Big Data Predictive Analytics Solutions, Q1 2013](#)  
January 3, 2013

[The Business Impact Of Mobile Engagement](#)  
December 18, 2012



## APP EXPECTATIONS SOAR TO NEW HEIGHTS

Application development professionals and their business counterparts are caught in a trap. They swim in game-changing new technologies that can access more than a billion hyperconnected customers, but they struggle to design and develop apps that delight customers and dazzle shareholders with annuity-like streams of revenue.<sup>1</sup> The challenge isn't application development; app developers can ingest and use new technologies as fast as they come. The challenge is that developers are stuck in a design paradigm that reduces app design to making functionality and content decisions based on a few defined customer personas or segments.<sup>2</sup>

How could there be anything wrong with this conventional design paradigm? Functionality? Check. Content? Check. Customer personas? Ah — herein lies the problem. These aggregate representations of your customer can prove valuable when designing apps and are supposedly the state of the art when it comes to customer experience and app design, but personas are blind to the needs and hopes of the individual user. That was fine in 1999 and maybe even in 2009 — but no longer, because:

- **Digital disruption is raising expectations . . .** Thanks to digital disruption — a force that combines digital tools and platforms to allow companies to meet customer needs more fully all at a lower cost — people have come to expect that technology should practically be able to read their minds, delivering hyperpersonal functionality and content when and where they need it.<sup>3</sup> It's truly the age of the customer, and these customers want all of the brands they do business with to serve them lavishly and treat them like royalty.
- **. . . and a powerful convergence of technologies is coming to the rescue.** At the same time that consumers are exploring their newfound power, the capabilities that application developers can leverage keep changing. Four key rising technologies allow developers to keep up with consumers: 1) Mobile device proliferation gives you two-way connections to billions of always addressable customers; 2) the wearable and embedded Internet of things can add even more context; 3) big data predictive analytics can find deeper personal insights about your customers; and 4) cloud computing offers you affordable, massive computing power.<sup>4</sup> Any one of these trends could shake up app development on its own, but *combined* and properly understood, they enable a new era: the era of predictive apps.

## PREDICTIVE APPS DELIVER INDIVIDUAL EXPERIENCES

Personalized experiences have come to mean anything but. App personalization involves preordaining a range of options and letting the user set those options as they please, like skinning a user interface or choosing whether they have to confirm a file deletion or not. *Individual* experiences go much deeper than that, anticipating what customers need even before they know it and giving them the option to have it without searching through menus or swiping the screen excessively to make it happen, much like a child finger-painting. Individual experiences can only

happen by applying big data predictive analytics in support of a new design paradigm to create what Forrester calls *predictive apps* (see Figure 1).<sup>5</sup> Forrester defines predictive apps as:

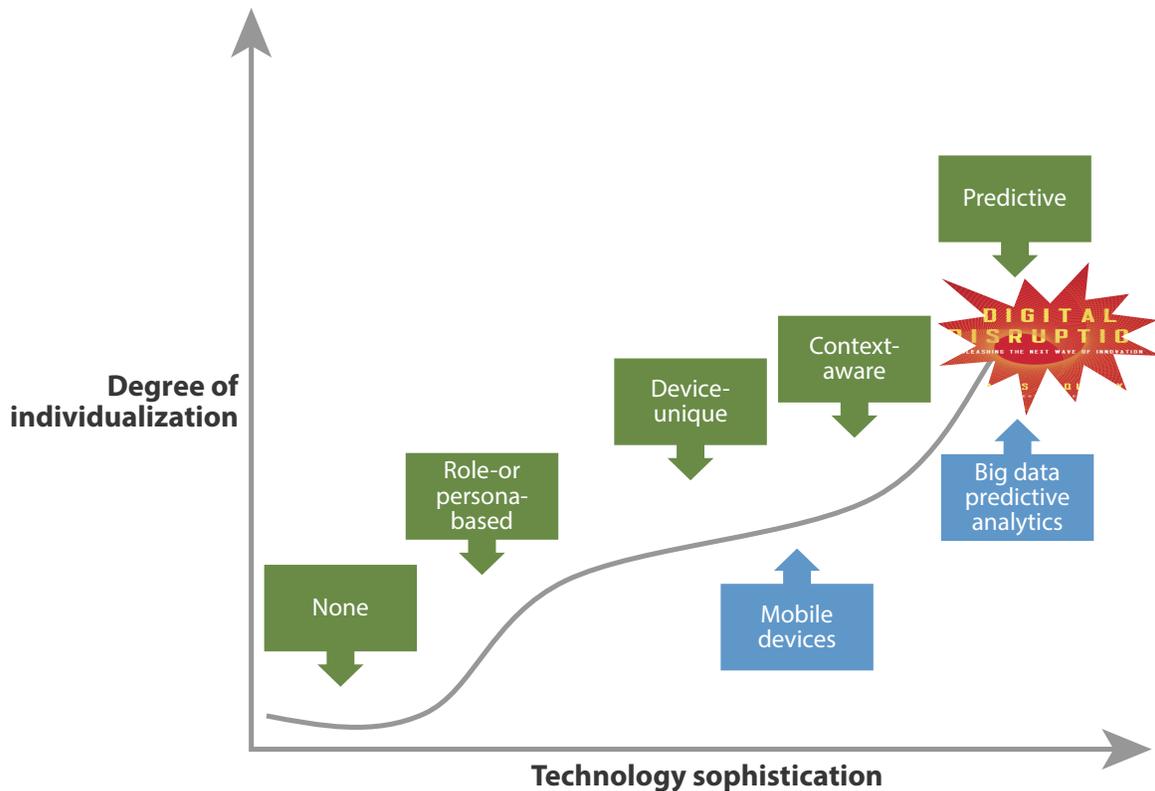
*Apps that leverage big data predictive analytics to anticipate and provide the right functionality and content on the right device at the right time for the right person by continuously learning about them.*

Using this definition, predictive apps are like a digital butler — ready to serve you when needed, understand how you like things done, and get better with time by learning more about you. To get this good, predictive apps must:

- **Anticipate.** Predictive apps draw on personal and environmental context to anticipate in-the-moment needs. The information needed to do this comes from a combination of sensors in mobile or wearable devices, environmental sensors, information stored in personal apps such as a calendar, and historical behaviors. This information about the past and present suggests a likely — and desirable — future outcome.
- **Individualize.** Anticipating the need is just the beginning. Predictive apps must determine the next best action from the individual's current situation to the anticipated outcome with as little user input as possible. Today's apps wait for you to tell them you want their input or what you need next and then let you navigate a user interface to make it happen. Predictive apps will anticipate and individualize to reach more desired outcomes more often. An app that knows you're on your way to a hotel where you already have a reservation is nice, but one that also automatically checks you into the hotel and confirms that you got the room away from the elevator that you usually want — all as you walk through the lobby — is truly anticipatory.<sup>6</sup> And the app also generates an inaudible sonic key to unlock the door of your hotel room.

Just as discretion is at the top of any respectable butler's job description, so too is it a key characteristic of predictive apps. To know the customer this well, apps will have to use customer data in ways that will deliver the kinds of anticipatory and individual experiences that will hook them — while keeping mum about all of it long enough that customers come to trust the app, and the company behind it, for the long haul.<sup>7</sup>

**Figure 1** Predictive Apps Take Application Development To The Next, Individualized Level



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Source: Forrester Research, Inc.

### Four Design Principles Distinguish Predictive Apps

To build anticipatory, individualized app experiences, application developers will harvest the rising crop of big data, applying predictive analytics to continuously tune the app experience by:

1. **Learning who the customer really is.** You've probably heard the story about how Target shocked the father of a teenage girl by sending her coupons for baby items before he even knew she was pregnant.<sup>8</sup> Target got one thing about her right — but missed another (big) one. Learning who the customer really is requires more than knowing just one thing about them. It's about connecting customer behaviors that you've discovered via any channel and inferring a psychographic understanding of who the customer is — their values, aspirations, interests, and opinions — from those behaviors.<sup>9</sup> Predictive apps can use the same technique to continuously formulate psychographic and behavior profiles for individuals to understand how they are different and how that can translate to an individualized app experience.

- 2. Detecting the customer's intent in the moment.** When a customer walks into Home Depot, the ideal sales associate can glean a great deal about that customer's intent in a few seconds of conversation. Predictive apps can't have direct conversations (yet), but they can infer in-the-moment intent from a combination of individualized predictive models, device sensors such as geolocation, and using direct customer feedback to learn.

For example, a predictive shopping assistant app could offer Williams-Sonoma mobile coupons to a customer who intends to buy cookware. The app detects the customer's presence at the Wrentham Village Premium Outlets mall and uses big data analytics to create a predictive model indicating that this is a new homeowner who recently purchased appliances at Sears. The predictive model determines that, because the person is near Williams-Sonoma, there is a 76% chance that she will walk in to buy cookware. The customer could walk by dozens of other stores without any coupons appearing on her mobile, because the model hasn't established that it's very likely that she'll buy anything at those stores. Intensively individualizing the shopping assistant app means that the customer will value a relevant offer rather than being annoyed at having to sift through too many irrelevant ones.

- 3. Morphing functionality and content to match intent.** More than anything, predictive apps offer customers individualized — not just personalized — experiences. To do this, they must dynamically tailor functionality and content to the customer and his in-the-moment intent. For example, imagine an insurance app that uses the accelerometer in a smartphone or in-dash system to detect the severity of an automobile collision. For a fender-bender, the app can display an accident report form and automatically call police. For a more severe accident, it can automatically call an ambulance and display first aid advice.
- 4. Optimizing for the device (or channel).** Two-thirds of online adults own two or more connected devices — and they don't just use them at home.<sup>10</sup> Developers must optimize predictive apps based on the form factor of the devices on which customers will use them, and even work to deliver an omnichannel experience where appropriate. Desktops, laptops, smartphones, tablets, and embedded interfaces in refrigerators, televisions, and autos have numerous device input features, sensors, and display sizes. For example, Google can now serve ads on mobile devices based on a prior search on the Web when the retail store is open.<sup>11</sup>

The result? Predictive apps have contextual awareness and adapt to serve a single individual.

### **Predictive Apps Are The Future — And The Future Is Now**

It sounds like science fiction, that's true. But take one look at the individualized, anticipatory experience that Google Now provides and it's clear to see that predictive apps are turning science fiction into fact right before our eyes. The Google Now service combines information that Google knows about you from your device as well as your search and location history to automatically

suggest information you might need. Stand next to a train station and Google Now may show you the train schedule, guessing at your destination based on your prior visits to the area. Get off an airplane in a new city and Google Now will automatically offer directions to hotels you searched on Google the week before. Google Now is a predictive app, but Google isn't the only firm out there that can infuse prediction into apps:

- **Netflix could match its recommendations to your time and device.** Netflix knows the device you're on today; with your permission, it could also learn your location and even access your calendar to see how much time you have. Armed with that information, the company could anticipate how much time you want to spend and automatically make recommendations that fit your calendar, your location, and your device. Netflix can further sharpen its recommendations as you interact with it.<sup>12</sup>
- **Cupid's digital arrow can aim with algorithmic accuracy.** More than 90 million Americans turn to dating sites such as eHarmony, Match.com, OkCupid, and Plentyoffish.com to help them find the perfect love connection. Currently, these sites match you to potential mates based on your criteria and then let you do the work. Tomorrow, predictive analytics baked into these sites will monitor your on-site interactions and offer suggestions to make your chats and dates more effective.<sup>13</sup>
- **Nike and The Cheesecake Factory work together to keep you healthy.** The possibilities for predictive apps expand exponentially if the brands in people's lives share information. Imagine that a customer walks into The Cheesecake Factory at the Burlington Mall and taps the Cheesecake Factory app on her iPad mini. Immediately, a menu appears that's customized to her gastronomic preferences. But that's not all — the app further individualizes the menu based on the data collected from her Nike+ FuelBand. She ran five miles this morning, so this time she can have dessert — her favorite, Kahlua cocoa coffee cheesecake. This is an example of how predictive apps will enable firms to acknowledge and serve different people more effectively.
- **Uber's mobile app digitally disrupts taxis.** Uber Technologies made taxi drivers angry by developing a mobile app that matches travelers with private sedans. The app allows travelers to request car service immediately, because it uses the GPS in the mobile phone to determine the traveler's location and match them with the nearest waiting sedan. Uber can kick the app up a notch for sedan drivers by using past information to predict the best spot to be in; being closer to travelers will increase their revenue.
- **A Nest thermostat learns your habits to save energy in your home.** Replace your old thermostat with the one from Nest Labs and you'll harness predictive analytics to save heating and cooling costs. The Nest's temperature, moisture, and motion sensors feed machine-learning algorithms to learn about when you are home and how you like the temperature; it uses this predictive model to adjust your heating and cooling systems throughout the day to save energy while keeping you comfortable.

- **Commuters avoid traffic jams in the Dutch city of Eindhoven.** Drivers automatically share their cars' braking, acceleration, and location data from embedded sensors in their car with the central traffic authority and receive alternate route recommendations in return. Predictive models use relevant sensor data to detect the presence of potholes or icy roads that city authorities can react to.<sup>14</sup> Tomorrow's predictive driving apps will provide more than just routing information — they'll learn your driving patterns to suggest parking spots in the city and driving routes home to allow you make running errands like picking up dry cleaning, stopping by the supermarket, or picking up kids at soccer practice more efficient.

Now imagine predictive app innovation in your firm's future.<sup>15</sup> What predictive apps can you design, develop, and deploy that will dazzle your customers and digitally disrupt your competitors?

## YOU NEED NEW TECHNOLOGY AND A NEW MINDSET TO DELIVER PREDICTIVE APPS

We aren't saying that predictive apps are easy. On the contrary: Only the most driven entrepreneurs, technologists, and innovative business executives will take this on. Those that do must reimagine how predictive apps can transform their digital relationship with their customers and master the new technologies that are necessary to make it happen. First, you'll need to master the nexus of enabling technologies, as predictive apps are not possible unless those technologies work together seamlessly:

- **Mobile is your eyes, ears, and voice.** Every smartphone and tablet is simultaneously a sensor that collects user-generated content, app behavior, location, and other in-the-moment contextual information and a direct channel to the individual who uses it. This provides predictive app designers with potentially more individualized data to design more personal apps and a channel to provide the right functionality and right context at the right time.
- **Big data predictive analytics can find eerily personal insights about your customers.** The growth of personal customer data has been volcanic due to the increasing connectedness of people around the world. Predictive app designers can use predictive analytics to discover what's not obvious and infer personal information about people.<sup>16</sup> Predictive analytics uses machine learning algorithms on big data to implement in-the-moment intent and adapt functionality and content to individuals.
- **Wearables, sensors, and embedded devices can add even more context.** The customer in our Nike/Cheesecake Factory example above wore a Nike+ Fuelband on her wrist that uses an accelerometer to track her physical activities such as walking, running, and dancing — a category of devices known as “wearables.”<sup>17</sup> Embedded devices are sensors integrated into otherwise “dumb” objects, such as textiles, toothbrushes, mattresses, mirrors, thermostats, doorways, steering wheels, or parking spots. Wearables collect data about our physical bodies; embedded devices collect data about the physical environments we inhabit. Wearables and embedded devices can add a tremendous amount of additional historical or contextual information that designers can use to deliver more personal app experiences.

- **Cloud computing offers you affordable, massive computing power.** Essential to using all the data collected from mobile, wearables, sensors, and embedded devices is the ability to store, process, and access it all. The economics of cloud computing can make it easier for startups and enterprises alike to get the computing power they needed to continuously analyze the data with predictive algorithms.<sup>18</sup> The case for using the cloud is even stronger when one considers that an increasing proportion of information about people we want to predictively analyze is already in the cloud.

### You Need A New Design Approach To Deliver Predictive Apps

Google CEO and cofounder Larry Page said, “The perfect search engine is one that understands exactly what you mean and gives you exactly what you want.” You must adopt this mindset to design predictive apps. The perfect app is one that anticipates exactly what you will need and gives it to you. But perfection is a journey, not a destination. Prediction is about probabilities; it’s about getting better and smarter at varying functionality and content until your app consistently delivers the right content at the right time on the right device. Having a predictive app mindset means that you must:

- **Creatively enumerate intents and actions to design functionality and content.** Use personas and journey maps to get a baseline understanding of your customers. But you must go way beyond personas to design more individualized app experiences: You need to understand the key variations that you can use to predict in-the-moment intent and recognize the best actions to take to fulfill that intent. To do this, you and your design team should brainstorm all of the possible in-the-moment intents that your users may face that are relevant to your services (this is how predictive apps avoid annoying people with unnecessary interactions). Then, for each intent, brainstorm the actions that your app could take to help achieve that goal (see Figure 2).
- **Infuse your app with predictive components.** Designing a predictive app is a process of using sensors and customer profile and history to detect the in-the-moment intent and then matching it to possible actions. Predictive apps use predictive models to determine which intents are relevant to the user and which actions would be most helpful. The app then uses rules about each action to generate functionality and/or content. Finally, the system learns from each episode, so it can get smarter about what intents and actions individual customers prefer (see Figure 3).
- **Capture and store all data about customers.** Don’t prejudge any of your data. The more information you gather, the more comprehensive a predictive app you can deliver. Most legacy customer data management (CDM) platforms or customer relationship management (CRM) solutions fail to address all of the information about customers: the devices they use; their family relationships, social interactions, geolocation history, mood, and aspirations; and the adjacent firms they do business with (see Figure 4). This is what a good friend would know; you need as much of this as possible to deliver a personal experience. A next-generation

CDM platform must provide all customer information available from sources including psychographics, social networks, smart devices, geolocation, and Internet usage to deliver individualized and contextual products, services, and experiences.

- **Establish a predictive analytics regime.** When was the last time you built an application with a predictive model at its core? Probably never. Predictive apps require it — meaning that you must also have a big data predictive analytics platform to capture, analyze, and refine predictive models to continuously learn more about individuals and their in-the-moment intents (see Figure 5).<sup>19</sup> Knowledge of how to use machine-learning algorithms is essential to predictive analytics. Hire fresh computer science or math grads and ask them to crack open their textbooks or take an online course in machine learning algorithms.<sup>20</sup> To learn about the leading software solutions, read Forrester’s Wave™ on big data predictive analytics solutions.<sup>21</sup>
- **Architect for morphable functionality and content across all relevant digital channels.** Technology architecture must also change to support predictive apps. Like all apps, predictive apps must support the seven qualities of great software: user experience, availability, performance, scalability, adaptability, security, and economy.<sup>22</sup> But apps must place additional emphasis on real-time adaptability to morph functionality and content according to the variations you’ve identified for individual users. This means that, instead of hard-coded forms and screens, both functionality and content must morph as needed, requiring more logic focused on the user experience than for normal forms-based or simple content apps.

**Figure 2** Defining Events, Intents, And Actions Are The Core Design Ingredients Of Predictive Apps

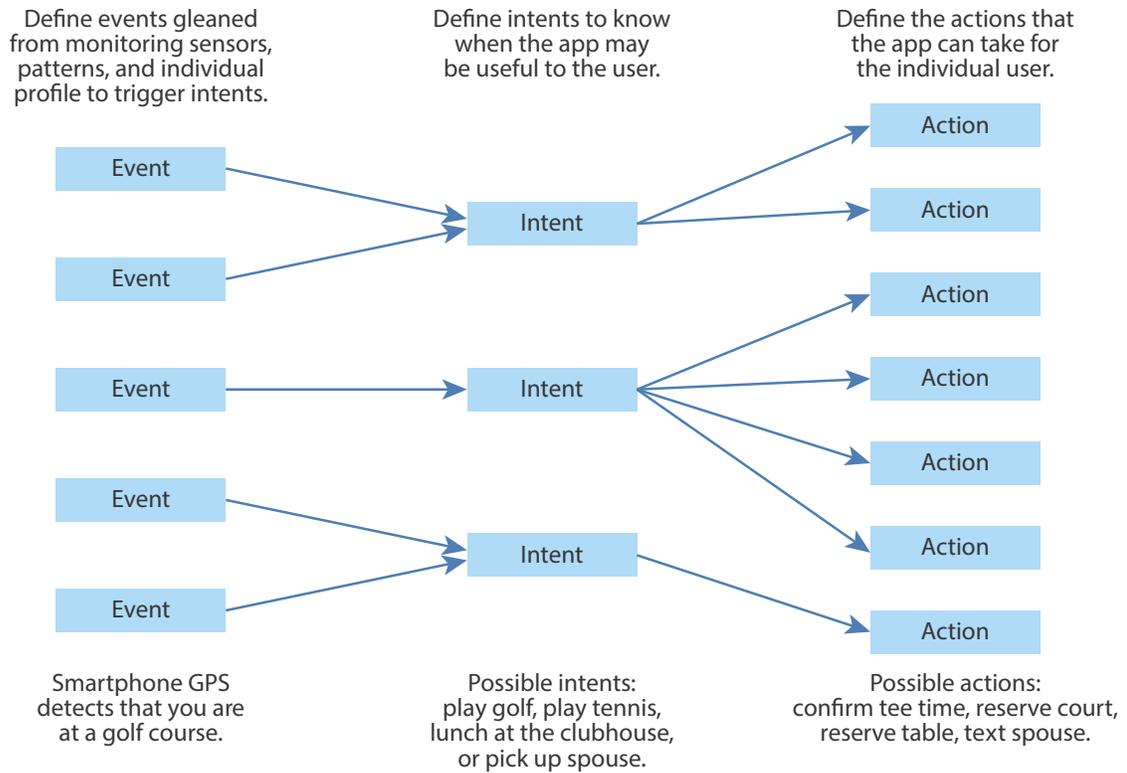
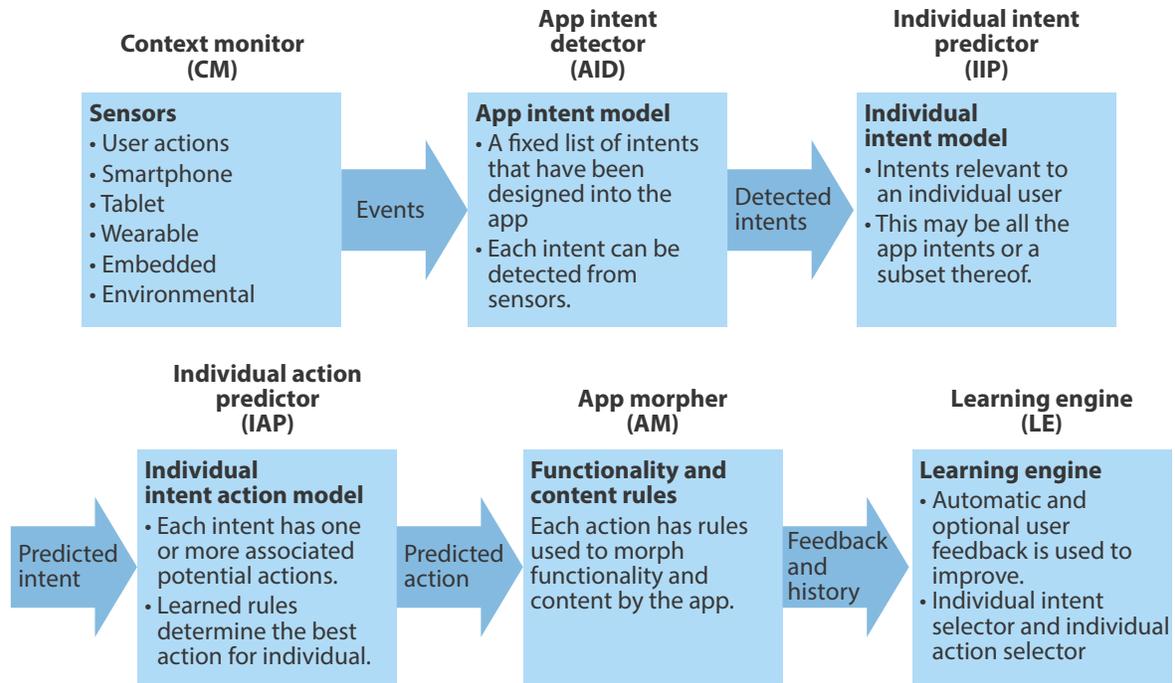


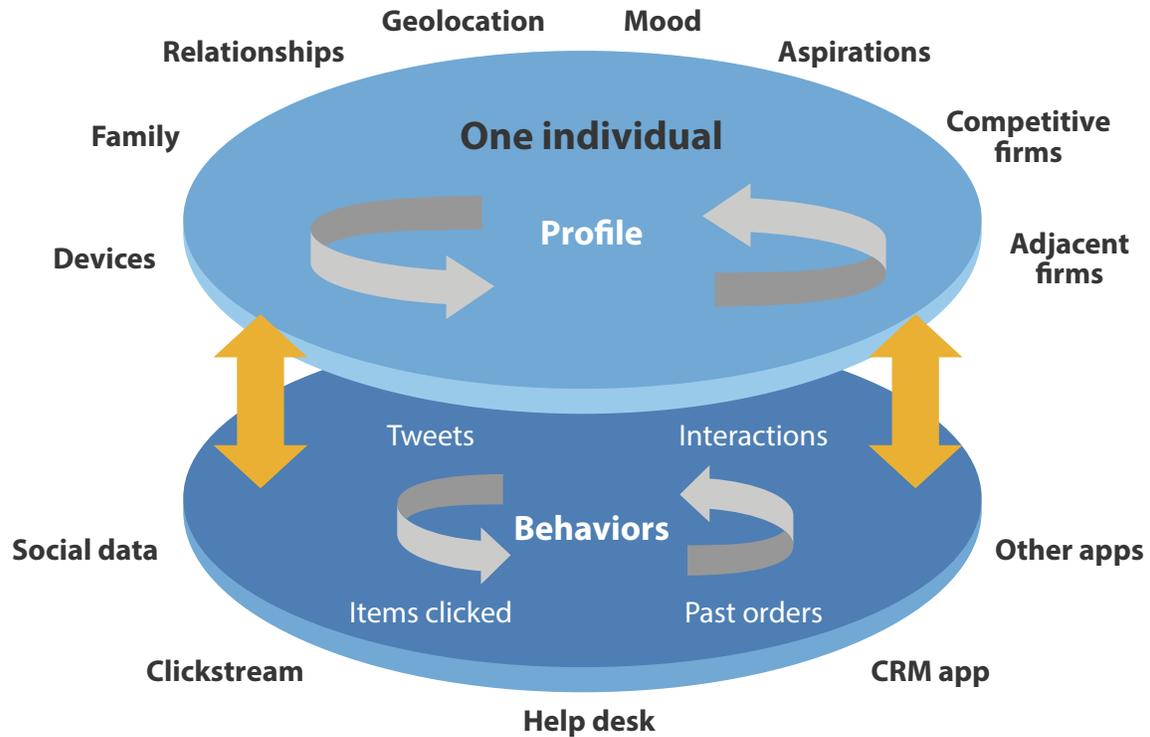
Figure 3 Predictive App Architecture



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Source: Forrester Research, Inc.

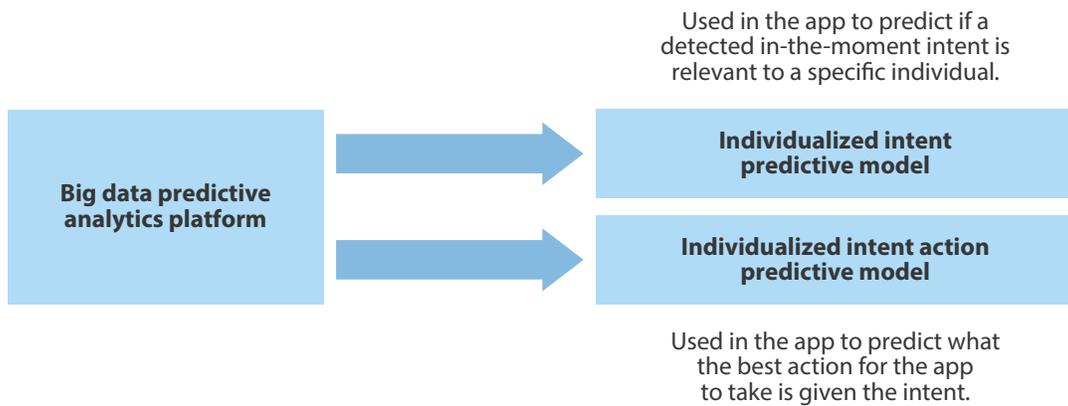
Figure 4 A Multidimensional View Of The Customer Is Essential For Predictive Apps



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Source: Forrester Research, Inc.

Figure 5 A Big Data Predictive Analytics Capability Must Exist To Generate Predictive Models



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Source: Forrester Research, Inc.

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## RECOMMENDATIONS

### IT'S TIME TO EXPAND THE TEAM AND MAKE A LEARNING LEAP

Buckminster Fuller once said, “We are called to be architects of the future, not its victims.” AD&D professionals have always risen to the occasion for web, cloud, and mobile. Predictive is next — but it's a much bigger shift than web, cloud, or mobile because AD&D organizations must add new skills and roles to their teams:

- **Psychologist.** Traditional app development methodology focuses on understanding the shared requirements of users. While understanding shared requirements is still critical, predictive apps must take requirements a giant step forward to create truly individualized apps. Application development teams must learn how to create intent/action models to design predictive apps.
- **Data scientist.** To traditional apps, data is input and output. Predictive apps also use data to drive app functionality. Predictive apps must be data-driven to handle the almost limitless variations that are possible when serving individuals. Data scientists must wrangle big data from a multitude of sources, create and test hypotheses to serve the intent model, run existing or invent new algorithms to generate predictive models, and continuously refine the models as new insights become available from subsequent user behavior.
- **Hyperpersonal experience designer.** Predictive apps must be packaged with the appropriate interaction and visual design. User experience designers can bring the necessary skills — but be careful that they're not stuck in the old paradigm. They must design interactions and visualizations that morph functionality and content at the right time, for the right device, for the right person.

AD&D teams should not sit idly by waiting for enlightened executives to offer these resources. Many application developers will have to educate businesspeople about the possibility of predictive apps before getting the resources they need. And even that may take too long. AD&D professionals can step outside of their comfort zone and start to learn about the psychology of customers, data science, and user experience design. What price are you willing to pay to become a digital disruptor? Hopefully, it's higher than your competitors are willing to pay.

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## WHAT IT MEANS

### PREDICTIVE APPS: WHAT A BEAUTIFUL, DISRUPTIVE WORLD IT WILL BE

We live in a world of 7 billion “me”s. Your customers increasingly expect and deserve to have a personal relationship with you and the hundreds of firms in their lives. Companies that continuously ratchet up individualization will succeed. Those that don't will be increasingly become strangers to their customers. This sounds bad — but there is good news. The world is flush with big

data, and it's getting flusher thanks to data from the cloud, mobile, and the Internet of things. Your firm can harness this data to design and develop predictive apps that create intensely individualized digital experiences. The result: breakthrough innovation. You and your firm have become digital disruptors — winners in the age of the customer. What a beautiful world it will be.

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## ENDNOTES

- <sup>1</sup> We are in an era of pervasive connectivity, and understanding the always addressable customer living in this era is key to future marketing strategies. Always addressable customers are a significant part of your audience today, tomorrow they will be the majority. See the September 26, 2012, "[The Always Addressable Customer](#)" report.
- <sup>2</sup> A persona is a vivid, narrative description of a named fictitious person representing a segment of your user population that you create to guide your mobile user experience design. Alan Cooper introduced the concept of personas in 1999. Since then, the practice of creating personas and using them to drive design decisions has caught on across a broad spectrum of marketing, product development and design, and customer service. Source: Alan Cooper, *The Inmates Are Running the Asylum: Why High Tech Products Drive Us Crazy and How to Restore the Sanity*, Pearson Education, 2004.
- <sup>3</sup> Empowered customers are disrupting every industry; competitive barriers like manufacturing strength, distribution power, and information mastery can't save you. In this age of the customer, the only sustainable competitive advantage is knowledge of and engagement with customers. The successful companies will be customer-obsessed, like Best Buy, IBM, and Amazon.com. Executives in customer-obsessed companies must pull budget dollars from areas that traditionally created dominance — brand advertising, distribution lockup, mergers for scale, and supplier relationships — and invest in four priority areas: 1) real-time customer intelligence; 2) customer experience and customer service; 3) sales channels that deliver customer intelligence; and 4) useful content and interactive marketing. Those that master the customer data flow and improve frontline customer staff will have the edge. See the June 6, 2011, "[Competitive Strategy In The Age Of The Customer](#)" report.
- <sup>4</sup> Source: Mike Gualtieri, "Intro To Predictive Analytics Reading List," Mike Gualtieri's Blog, March 20, 2013 ([http://blogs.forrester.com/mike\\_gualtieri/13-03-20-intro\\_to\\_predictive\\_analytics\\_reading\\_list](http://blogs.forrester.com/mike_gualtieri/13-03-20-intro_to_predictive_analytics_reading_list)).
- <sup>5</sup> Forrester uses app interchangeably with application and software. Although the term "app" originated to describe mobile applications, specifically on the iTunes App Store, the term has expanded as shorthand for applications or software that run on any device or platform.
- <sup>6</sup> To understand the key principles of mobile experience to build mobile marketing maturity, see the January 18, 2013, "[Understand Immediacy, Simplicity, And Context](#)" report.
- <sup>7</sup> The personal cloud will cause a dramatic change in market opportunities, use this report to help understand the emerging ecosystem around personal cloud services. See the June 6, 2011, "[The Personal Cloud: Transforming Personal Computing, Mobile, And Web Markets](#)" report.

- <sup>8</sup> Source: Charles Duhigg, “How Companies Learn Your Secrets,” The New York Times, February 16, 2012 (<http://www.nytimes.com/2012/02/19/magazine/shopping-habits.html>).
- <sup>9</sup> Psychographic profiles can augment demographic profiles to get more insight into people’s activities, interests, and opinions.
- <sup>10</sup> Consumers of all ages are embracing the opportunity to find information and connect with people and brands wherever they are — at home, in the car, while shopping, and during many other aspects of their daily lives. For companies, this means the emergence of the always addressable customer — a large and growing audience that demands value from the brands with which they engage. See the December 19, 2012, “[The State Of Consumers And Technology: Benchmark 2012, US](#)” report.
- <sup>11</sup> Source: Google (<http://www.google.com/adwords/enhancedcampaigns/features/>).
- <sup>12</sup> Netflix’s recommendation engine was so key to the company’s success that it offered a \$1 million prize for substantially improving the engine’s performance. Source: Netflix (<http://www.netflixprize.com/>).
- <sup>13</sup> Source: Dan Slater, *Love in the Time of Algorithms*, Current Hardcover, 2013.
- <sup>14</sup> Source: “Dutch City Region of Eindhoven Works with IBM and NXP to Improve Traffic Flow and Road Safety” IBM press release, February 21, 2013.
- <sup>15</sup> Most product strategists proceed in an entirely reasonable fashion: They set proximate goals and move toward them in a linear mode, tweaking a product or service to fulfill the well-understood goals of the organization and, hopefully, the needs of the end customer as well. While this has been a fine way to approach a business for as long as commerce has existed, it is not enough to power the big product innovations that will dominate the future of any industry touched by digital technology. Instead, we propose a completely unexpected and hard-to-imagine — but impossible-to-defend-against — approach. We call it “innovating the adjacent possible,” and if product strategists dare adopt it and adhere to the three principles it reveals, it will give them what they need to generate the next big product idea for even the most analog industries. See the August 4, 2011, “[Innovating The Adjacent Possible](#)” report.
- <sup>16</sup> Predictive analytics enables firms to reduce risks, make intelligent decisions, and create differentiated, more personal customer experiences. But predictive analytics is hard to do without the right tools and technologies, given the increasing challenge of storing, processing, and accessing the volume, velocity, and variety of big data. In Forrester’s 51-criteria evaluation of big data predictive analytics solution vendors, we evaluated 10 solutions from Angoss Software, IBM, KXEN, Oracle, Revolution Analytics, Salford Systems, SAP, SAS, StatSoft, and Tibco Software. This report details our findings about how well each solution fulfills the criteria and where they stand in relation to each other, and it helps application development and delivery professionals select the right big data predictive analytics solution. See the January 3, 2013, “[The Forrester Wave™: Big Data Predictive Analytics Solutions, Q1 2013](#)” report.
- <sup>17</sup> Wearables, or sensor-laden devices, will be the vehicles that drive the world into the realization of “the Internet of things” dream. See the October 17, 2012, “[Smart Body, Smart World](#)” report.
- <sup>18</sup> Cloud solutions are not automatic cost savers for all organizations in all situations. Companies that are able to take advantage of solutions that fit their molds will reap the benefits of this powerful, flexible opportunity. See the June 20, 2012, “[Understand The True Cost Of Cloud Services](#)” report.

- <sup>19</sup> Predictive analytics solutions allow firms to make more confident decisions, create differentiation, and reduce campaign risk. However, successful implementation is difficult without the right tools and technology solutions, compounding the challenges of volume, velocity, and variety. See the January 3, 2013, “[The Forrester Wave™: Big Data Predictive Analytics Solutions, Q1 2013](#)” report.
- <sup>20</sup> Source: Coursera (<https://www.coursera.org/course/ml>).
- <sup>21</sup> Predictive analytics enables firms to reduce risks, make intelligent decisions, and create differentiated, more personal customer experiences. But predictive analytics is hard to do without the right tools and technologies, given the increasing challenge of storing, processing, and accessing the volume, velocity, and variety of big data. In Forrester’s 51-criteria evaluation of big data predictive analytics solution vendors, we evaluated 10 solutions from Angoss Software, IBM, KXEN, Oracle, Revolution Analytics, Salford Systems, SAP, SAS, StatSoft, and Tibco Software. This report details our findings about how well each solution fulfills the criteria and where they stand in relation to each other, and it helps application development and delivery professionals select the right big data predictive analytics solution. See the January 3, 2013, “[The Forrester Wave™: Big Data Predictive Analytics Solutions, Q1 2013](#)” report.
- <sup>22</sup> Balance seven core components of software design in order to deliver code that is flexible, innovative, and engaging. See the January 24, 2011, “[The Seven Qualities Of Wildly Desirable Software](#)” report.

## About Forrester

A global research and advisory firm, Forrester inspires leaders, informs better decisions, and helps the world's top companies turn the complexity of change into business advantage. Our research-based insight and objective advice enable IT professionals to lead more successfully within IT and extend their impact beyond the traditional IT organization. Tailored to your individual role, our resources allow you to focus on important business issues — margin, speed, growth — first, technology second.

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« ANDREA DAVIES, client persona representing Application Development & Delivery Professionals

