The Future of Biometrics

Market Analysis, Segmentation & Forecasts

Insight into the Trends, Drivers & Opportunities that will Shape the Industry through 2020

includes detailed market forecast 2009—2017

Published
August 2009

by

ACUITY
MARKET INTELLIGENCE

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About Acuity Market Intelligence

Acuity Market Intelligence is the biometric industry's leading independent strategic consultancy. Acuity cuts through the clutter of information overload to provide technology-neutral and vendor-independent industry analysis for the biometrics industry and other emerging technology markets. Acuity's established reputation for candid, "hype free" insight is based on a proven record of accurately anticipating biometric and associated identification solutions market trends. Acuity relies on *rigorous intuition*—a combination of quantifiable, data driven analysis and insight honed over two decades—to consistently provide original, thought provoking, accurate, and reliable industry analysis.

The core of Acuity's knowledge base is a fundamental understanding of technology market development, technology evolution in emerging markets, and how technology is adopted and deployed most effectively in targeted vertical markets. This knowledge is applied through proven tools and techniques to help vendors, integrators, investors, and end-users:

- Identify, prioritize, and size lucrative market opportunities.
- Define and analyze targeted vertical solutions.
- Create and evaluate market development and adoption strategies.
- Achieve sustainable market dominance.
- Evaluate deployment plans within the context of generating quantifiable ROI.

Market Development Expertise

Acuity's singular focus is on the development of emerging technology markets providing expertise in the following areas:

Market Analysis – Identification and evaluation of key technological developments, market trends, industry players, and deployment effectiveness.
Opportunity Analysis – Highly granulated vertical market segmentation and identification, prioritization, and sizing of the most lucrative opportunities for a given product, service, or solution.
Solutions Analysis – Requirements and functional specifications for applications of emerging technology.
Due Diligence – Evaluation of market players to ensure:

- Opportunities have been adequately and accurately assessed.
- Financial, operational, and strategic plans are in place to create sustained market viability.
- Product and service quality can be demonstrated.

Strategic Planning – Creation of highly leveragability plans to develop, evaluate and deploy emerging technology-based solutions with the objective of achieving the highest degree of customer satisfaction and sustained market dominance.

Client Services

Clients leverage Acuity's knowledge and expertise through a range of off-the-shelf, semi-custom, and fully custom product and service offerings. These include:

Executive Briefings & Strategy Sessions – Interactive sessions provide targeted insight to Client Executives.
Consulting – Custom projects designed to support specific Client objectives.
Segment Tracking – On-going coverage of technologies, players, market drivers and dynamics of a particular industry sector or technology marketplace.
Reports – Periodic and one-off targeted analyses focused on a range of topics including: technology evolution, application development, vertical market adoption, and competitive analysis.
Research – Standard and semi-custom research projects designed to address specific industry knowledge gaps.
Workshops – One to two day intensives presenting Acuity's proprietary methodology for applying proven tools and techniques to identify, prioritize, and size market opportunities.

Please contact **Acuity Market Intelligence** for additional information
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Report Overview

SCOPE: This report presents unique insight into how the biometrics market will evolve through 2020, what will drive and shape this market evolution, and where the most lucrative biometric market opportunities will be. This report is not a biometric primer or a comprehensive overview of the industry. ***It is an advanced strategic market analysis that requires a basic understanding of the biometrics industry and associated market dynamics and technologies.*** *The report is presented in two parts.* Part One contains the strategic analysis and Part Two provides detailed market segmentation and market-based forecasts for 2009 through 2017

OBJECTIVE: This report provides a basis for short-term, mid-range, and long-term strategic planning for technology and solution development, market investment, and phased adoption of biometrics for both Public Sector and Commercial deployments.

AUDIENCE: Individuals responsible for strategic planning, business and market development, and sales within the biometrics community including: vendors, integrators, investors, consultants, distributors, solution providers, as well as Public Sector and Commercial end-users.

METHODOLOGY: Analysis is drawn from on-going market coverage of the industry including: significant market and technical developments, tests, pilots and deployments, as well as public domain and private data sources, research and reports, surveys, and interviews with vendors, integrators, intermediaries, customers, privacy and civil liberties advocates, and other relevant technology and vertical market industry experts. Forecasts are derived from modeling total potential market opportunities for the enhancement or replacement of existing technology and non-technology based processes and solutions, and the introduction of new processes and solutions based on the unique capabilities of biometric technology. Models rely on public domain and proprietary primary data sources and are flexibly structured to account for known and predictive factors. Primary sources determine known model data. These include data points like population, population age distribution and assocated government services and benefits, number of port facilities and border control points in a given country or region, annual passports issued, the number and type of enterprises in a given country or regin, government and enterprise employment, and deployed military and civilian staff and contractors. Models are then adjusted to account for existing market conditions, current deployments, anticipated projects, and existing and planned infrastructure. Conservative assumptions for predictive factors - such as technology pricing and anticipated adoption rates – are introduced to determine forecasts. Final forecasts represent the predicted penetration of the total market value over the forecast range.

KEY CONCLUSION**:** Over the next ten years the infrastructure to enable mainstream, ubiquitous biometric authentication will be developed. Biometrics will be a fundamental embedded component of the digital world, as it becomes a key enabler of trusted transaction control – data access and flow - for personal, commercial, and government use. This trusted transaction capability will ultimately define the genuine opportunity for revenue associated with deployment of biometric technologies. The technology itself will, in many respects, become inconsequential as the applications it delivers become essential components of twenty-first century life.

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Introduction

What is *The Future of Biometrics*? Strong consensus amidst well-founded apprehension indicates biometrics will become mainstream, ubiquitous technology. Opportunities abound and there has been successful initial market penetration for Physical and Logical Access, Identification Services, and Surveillance applications. From passports and ATMs to corporate network access and mobile phones, from the White Castle fast food chain and Pictet & Cie Banquiers, a renowned Swiss bank, to the Denver Rapid Transit Department Treasury and nuclear power plants, *biometric technologies are used by tens of millions of individuals across the globe for personal, commercial, and civil applications every day*. The most interesting and relevant question about the future of biometrics is not whether biometrics will prevail or even how quickly, but what is the path from today's effective but limited but use, to what most industry experts agree and most privacy and civil liberty advocates fear is biometrics ultimate destiny: *ubiquity.*

***The Future of Biometrics* provides insight into how the biometrics industry will evolve through 2020, what will drive this evolution, and where the most lucrative market opportunities will be. It is intended to provide a basis for short-term and long-term strategic planning for technology, as well as solution development and deployment for both Public Sector and Commercial applications. The report is presented in two parts. Part One contains the strategic analysis and Part Two includes market segmentation and forecasts for 2009 through 2017.**

Biometric industry revenue as defined in this report is limited to the sale, licensing, and installation of the hardware and software required to deploy biometrics as standalone solutions or integrate biometrics as part of larger identification solution. It does not include any revenue associated with the development, deployment, or integration of the non-biometric components of large-scale identification solutions.

Part One: Analysis

The first half of the report addresses fundamental questions that provide the context for developing a comprehensive view of the likely evolution of the biometrics marketplace.

- What are the Mega and Meta forces shaping the evolution of the market?
- Which industries and applications hold the most promise for biometric deployment?
- How will market demand shape technology evolution and the development of biometrically enabled solutions?
- What is the current state of the marketplace?
- How will the technology evolve and impact overall market development?
- How will the most substantial opportunities for industry players evolve?

Context

The Future of Biometrics begins with a fictional scenario representing what may prove to be a real world experience by 2020. This provides context for understanding the far-reaching implications of biometrics fully integrated into daily life.

Mega Trends

The eight global *Mega Drivers* are trends that will profoundly impact all IT development through 2020 and have important, specific implications for biometrics. They are:

- Globalization and Developing Economies
- Borderless Economies
- Workforce Decentralization and Mobility
- Population Mobility
- Proliferation of Mobile Devices and the Rise of Trusted Access Anywhere
- Central Role of Digital Identity
- Inevitability of eGovernment
- Rise of Cloud Computing

Meta Drivers

Application Solution and Technology Evolution *Meta Drivers* shape both opportunities for widespread deployment of biometrics as well as determine the technological capabilities required to address these applications.

The three key Public Sector *Application Solution Meta Drivers* are: eBorders, eID, and eGovernment.

The three key Commercial *Application Solution Meta* Drivers are: Enterprise Security, Information Transactions, Financial Transactions.

The four key *Technology Evolution Meta Drivers* are: Secure Identity Core, Secure Mobility, Secure Credentials, and Secure Transactions.

Obstacles and Opportunities
Biometric technology has the potential to enhance or threaten consumer and citizen rights and civil liberties, and exacerbate or eliminate opportunities for identity theft and fraud. Core biometric issues as well as those considered outside the direct purview of biometrics, but directly impacted by their use, are assessed relative to this inherent conflict. Central to this component of the analysis is the notion that these obstacles pose challenges that can be harnessed and transformed to provide significant opportunities for market leadership and dominance.

The State of the Market
The evolution of the biometrics market, though plagued by strange twists and turns, is on track for sustained growth. The post 9/11 promise of biometrics may not be materializing as expected; however, key applications in critical market sectors represent significant opportunities for market players who strategically focus efforts on building cost-effective solutions to business-breaking problems. Though several recent setbacks and failures of Public Sector and Commercial biometrically enabled programs have generated bad PR for the industry, *it is not the biometrics that failed*. The industry needs to move-on and continue to demonstrate the unique capabilities and ROI potential of biometrically enabled identification solutions. For both Public Sector and Commercial markets, citizen and consumer transactions may be the largest revenue generators and drivers of biometric adoption.

Future for Key Technologies
Technology evolution is inevitable and evolving capabilities and limitations will impact the relative success/ubiquity of each biometric modality. Technology convergence is also inevitable as is the emergence of multimodal biometrics as a major factor in the development of practical, ubiquitous biometric solutions. “Conventional” biometrics— AFIS/livescan, Finger. Face, Iris, Hand, Vein, Voice, Signature, Keystroke—are included in this analysis along with some of the emerging modalities. The role of multimodal biometrics and the impact of ancillary identification technologies are also discussed.

Part Two: Market Segmentation and Forecasts
The second half of the report includes market segmentation and forecasts for 2009 through 2017. A market or solution based approach is applied to the market segmentation. This is atypical in the biometrics industry where most published forecasts take a technology-based approach. This means the market segmentation in this report analyze opportunities and associated revenues in terms of geographic regions, market-based solutions, and technology applications rather than defining the size of a market based on technology revenue – e.g. the market for eBorders or Financial Transactions rather than the market for AFIS or Iris recognition. *The Future of Biometrics* approach provides data and perspective that is designed to support strategic market development planning.

Market Segmentation
The two key Application Solution domains and their associated sub domains - Public Sector (eBorders, eID, and eGovernment) and Commercial (Enterprise Security, Information Transactions, Financial Transactions) - are mapped against four key application areas— Physical Access, Logical Access, Identity Services, and Surveillance and Monitoring - to create market segmentation matrices. The resulting market segments are ranked in terms of development priority and timeframe. Each target market is also assessed in terms of the technologies (biometrics modalities) most likely to be deployed. Forecasts for the Commercial and Public Sector Application Solution domains, their sub domains, and select target markets are presented globally, by region, by technology, and by application.

Forecasts
A quantitative approach is applied to the market forecasts. This approach is based on development of scenario modeling tools designed to project total market potential for biometrically–enabled solutions within select markets. These modeling tools predict total market value based on an analysis of how biometrically-enabled solutions can augment or replace existing manual and/or automated processes, or introduce new processes based on the unique capabilities of biometrics within the given market sector and segment.

The models rely on public domain and proprietary primary data sources and are flexibly structured to account for known and predictive factors. Primary sources determine known model data. These include data points like population, population age distribution and assocated government services and benefits, number of port facilities and border control points in a given country or region, annual passports issued, the number and type of enterprises in a given country or region, government and enterprise employment, and deployed military and civilian staff and contractors. Conservative assumptions for predictive factors—such as technology pricing and anticipated adoption rates—are then introduced to determine forecasts. Final Forecasts represent the predicted penetration of the total market value over the forecast range, which in this case is 2009 through 2017

Preface to the 2009 Edition

I came across the following in an article entitled *Another day in paradise as life gets cryptic*, by Sathnam Sanghera in The Times Online on July 20, 2009.

> "The other day we got a message from our IT department at *The Times* informing us that password policy was changing as part of an annual Finance and Technology Sarbanes-Oxley audit, and that passwords must now be "eight characters long, contain a letter in upper case, a letter in lower case, a number, and a non-alphanumeric character (e.g. ?, £, %, $)". Meaning that "fluffykins", "B1 9AR" or "anotherdayinparadise" are no longer permissible and that even "BuRpy%2x" will work only for a while, as one is required nowadays to change one's password more often than you change your underpants."
>
> "I use seven passwords and passcodes to deal with my bank alone. Recent research has found that 88 per cent of employees use between five and six passwords at work. And in 2006 *The Wall Street Journal* reported that there was an insurance company where the agents needed to use 40 passwords during the average working day. The other day I spent a whole hour trying and failing, with the aid of those seven passwords, to make an online bank transfer that would have taken seconds in the days that customers had personal relationships with managers. And according to a UK survey conducted in 2004 by Microsoft, 60 per cent of computer users have at some point exhibited "anti-social behavior" in the form of shouting, "pouting in silence" and hitting computers, because of forgotten passwords"

Unfortunately, these anecdotal comments are representative of life in the twenty-first century for far too many of us. One would think the reality of these common experiences would be enough to justify and propel rampant adoption of biometrics. Sadly, this Is not true. In the two years since the original 2007 publication of this report, the industry has seen both significant accomplishments and considerable setbacks. While some major government programs have been scaled back (TWIC), are seriously behind schedule (HSPD-12 PIV cards), or have an uncertain future (UK National ID), others have been initiated (India's 1.5 billion and Mexico's 100 million strong National ID programs). Commercial investments in all non-essential IT has slowed to a crawl in the current economic climate, however, there is renewed focus on short-term ROI-based investment like time and attendance solutions. So, in spite of industry setbacks and a faltering global economy, the biometrics market remains healthy and is well positioned for steady, but slow growth.

The 2009 forecast numbers average approximately 10% below original 2007 projections for the overlapping forecast period 2009 through 2015. This adjustment is mainly due to lower than expected 2009-2010 growth attributable to stalled economy. Interestingly, while Acuity has been criticized over the last two years for underestimating the revenues projections published in 2007, most analysts have recast their projections downward during this period and have now published forecasts that are in line with Acuity's projections.

In addition to providing revised forecasts, the 2009 edition has been updated and expanded in both minor and significant ways. The elements of the market analysis that provide the context and conceptual framework stand on their own and have largely been left in tact. Minor edits and additions have been made where appropriate. For example, the Rise of Cloud Computing has been added as an eighth Mega Trend. Dated facts and relevant technical and programmatic updates have been added throughout the document as well.

A new analysis section has been added to Part One entitled "The State of The Market". This section provides insight into the current evolution of market development, provides a review of some of the of large government post 9/11 ID programs, and offers analyses of two key applications—Time and Attendance and Surveillance—and two industry verticals—Financial Services and Healthcare.

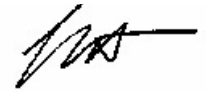
This section also takes a look at two highly visible commercial biometric business that went bust—Pay-by-Touch and the CLEAR registered traveler program. These programs together accounted for nearly half a billion US dollars in industry investment. Though each failed for their own reasons, each was doomed from their inception begging the question why is it that many small, viable biometric enterprises with great prospects for success are unable to acquire investment capital while these two ventures were able to attract significant investment with almost no chance of success?

A high-level view of the environment for market players is presented along with perspective on key developments that will impact the vendor landscape through 2020. A comprehensive competitive analysis is beyond the scope of this report and will be the subject of a follow-on report published later this year.

Finally, this section includes a discussion of the key market forecast findings from Part Two of this report. These market forecasts have been updated and greatly expanded from the original 2007 report. They now include forecasts by technology and application for the global market, for each public sector and commercial market sector, and for each region. Part Two features 29 new data tables, 27 new graphs, and 53 new charts as well as CAGR calculations for many of the existing market forecast graphs.

I hope that you find this document to be an insightful reference as you navigate the biometrics marketplace. As always, your comments, criticisms, suggestions, questions, and complaints are welcome!

Cheers,



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*Regions: North America: US, CA, Mexico
EMEA: Europe, Middle East & Africa
Central and South America
Asia Pacific: Asia, Pacific Rim

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