



MS Information Systems Industry Outlook

Note: 90% of the content in this report comes from Hoover's Industry Analysis - a tool available to Smith students while enrolled in classes. The remaining analysis came from sources such as CIO Magazine, Forbes and The Wall Street Journal - all sources Smith students should familiarize themselves with and use extensively.

- What Industries Are Smith MS Information Systems Graduates Working In?
Industry analysis of the top industries within which graduates of the MS Information Systems program are employed.
- Other Industries to Consider
Industry analysis of key industries and trends current MS Information Systems students should be aware of.
- Our Analysis Includes
 - Companies that Hired Smith MS Information Systems Graduates
 - The Top 20 U.S. Companies In the Market (based on revenue)
 - The Primary Trade / Policy Associations Related To The Industry
 - The Primary Trends Impacting Competition In The Industry
 - The Resources (Human Capital, Information, Technology, etc.) Critical To Being Competitive In The Industry

Follow MSIS Alumni - Analysis of Industries Attracting MS Information Systems Graduates

- [Advertising](#)
- [Business and Professional Associations](#)
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IT Consulting Industry:

The Big Four firms are obvious targets for MSIS students. They hire and sponsor visas and look specifically for the type of students we recruit at Smith. Think BEYOND the Big Four. The IT Consulting industry is a \$350 billion per year industry and the Big Four only have their hands on 15% of that market. When researching the companies below - be certain to research their competitors as well. It will be useful in job interviews and will expand your target list within the IT Consulting industry with **NO Wasted Effort**. Below are IT Consulting firms with a history of hiring Smith MSIS students.

Companies in this industry that hired Smith MSIS Graduates and their Job Titles:

- **Accenture** - Systems Integration Consultant
- **Argus Information and Advisory Services** - Client Delivery and Modeling Solutions Associate
- **Booz Allen** - Senior Consultant, Staff Technologist
- **Deloitte** - Analytics Consultant, Risk Advisory, Business Technology Analyst, EA Analysis
- **Ernst & Young** - Technology Advisory, ITqS, Forensics & Tech eDiscovery Services, Data Analyst
- **IBM** - Data Engineer, Analytics Consultant
- **ICF International** - Data Analyst
- **PwC** Associate - Technology, Forensics, Risk Assurance, Health Advisory, Cyber Security & Privacy

Top 20 U.S. in this industry likely to need MSIS talent:

- [Accenture LLP, Chicago, IL](#)
- [Amec Foster Wheeler, Tucker, GA](#)
- [Aon Consulting Worldwide, Lincolnshire, IL](#)
- [Bain & Co](#)
- [Boston Consulting Group](#)
- [Booz Allen Hamilton, Mc Lean, VA](#)
- [Ceb Inc., Arlington, VA](#)
- [Deloitte](#)
- [Ernst & Young](#)
- [Fti Consulting, Inc., Washington, DC](#)
- [Hewlett Packard Enterprise](#)
- [Huron Consulting Services, Chicago, IL](#)
- [IBM](#)
- [ICF International, Inc., Fairfax, VA](#)
- [KPMG](#)
- [Levi, Ray & Shoup, Springfield, IL](#)
- [Mckinsey & Company, New York, Ny](#)
- [Mercer Inc., New York, NY](#)
- [Navigant Consulting, Chicago, IL](#)
- [PwC](#)
- [The Advisory Board Company, Washington, DC](#)



IT Consulting Industry (Continued)

Consulting Magazine's 7 Small Jewels

1. [AArete](#)
2. [Acquis Consulting Group](#)
3. [DayBlink Consulting](#)
4. Eagle Hill Consulting
5. FluidEdge Consulting
6. [Lyons Consulting Group](#)
7. [Verity Consulting](#)

Consulting Magazine's 7 to Watch

1. Arc Aspicio
2. Dynamic Pro, Inc.
3. [Enovation Partners](#)
4. Impact Makers
5. T. White Parker
6. Xpio Health
7. Thought Ensemble

Industry Resources

Industry Associations & Events to Follow

- [Oracle Open World](#) - October 2017
- [SalesForce Dreamforce - November 2017](#)
- [Institute of Management Consultants](#)
- [Association for Information Systems](#)
- [Information Systems Security Association](#)
- [Information Systems Audit and Control Association ISACA](#)
- [Association of Information Technology Professionals](#)

Industry Websites

- [ALM Intelligence](#)
- [CIO Magazine](#)
- [Consulting Magazine](#)
- [Harvard Business Review](#)
- [Institute of Management Consultants](#)
- [Turnaround Management Association](#)
- [Vault](#)

Industry Trends

Cloud Consulting — Rapid adoption of cloud computing technologies is transforming the way that businesses and government agencies manage their IT resources. Many firms have dedicated cloud computing practices to address the burgeoning market.

Industry Consolidation — Big firms are adding fields of expertise through acquisitions, often buying the consulting practices and other nonaudit services of accounting firms. Large firms are expanding their reach into areas once served mainly by small consultants.



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IT Consulting Industry (Continued)

Greater Use of Consultants — The evolution of many US companies to a leaner business model has created greater demand for consultants. The expertise to structure and direct the operations of complicated businesses is difficult for many corporations to get internally, especially in rapidly evolving industries.

Consultants Expanding Services — Many traditional management consultants have added expertise in IT and HR, which have become important strategic factors in traditional fields like finance, marketing, and production.

More International Work — Consulting firms have followed the expansion of US corporations abroad and benefited from the greater volume of international mergers and acquisitions, which often require the help of consultants. Many consulting specialties have easily translated abroad.

Key Growth Opportunities

Health Care Consulting — The rapid growth of the healthcare sector and the rapid evolution of medical processes create demand for experts who can help hospitals and other industry participants provide health care more efficiently.

HR Consulting — The need to attract, retain, and manage the right kinds of employees has become an important management concern in many companies. Experts suggest HR consulting practices can help companies determine how engaged employees are and incorporate new practices that improve overall efficiency and morale.

Critical Resources

Cloud Computing Experts: Migration Experience, Security, Database Systems (SQL, MySQL, Hadoop, MongoDB), Programming Skills (Python, Perl, Ruby, .Net, PHP, Java)

Internet of Things (IoT) Experts: Machine Learning Algorithms, Big Data Extraction and Manipulation Techniques, Data Mining, Security Infrastructure

Healthcare IT (HIT) Experts: Knowledge of key HIT products and systems, Knowledge of HIPPA, Data Custody Control and Data Sharing Control Systems, Project Management Skills, Systems Integration Experience, Database Design Experience

HR Talent Management Technology Experts: Feedback and Engagement Application Developers, Social Media Sentiment Analysts, Ratings Systems Design and Data Analysis, GIS and Geolocation Data Analysts, Neural Network Analysts, Data Visualization and Dashboard Developers



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Internet & Mail Order Retail

Many industry analysts are predicting that the U.S. Retail Sales Industry has now reached a tipping point from which there will be no return. The online environment for consumer data analytics, supply chain and logistics analytics, operations data networking architecture, data storage, retrieval and cybersecurity is driving opportunities for MSIS students. Very few Smith MSIS students have explored the possibilities outside two main players in this market: Amazon and Walmart technology - both firms with a history of hiring Smith MSIS students. Amazon.com is by far the dominant global force in internet retail, capturing 43% of all US online sales in 2016 and more than half of all 2016 growth in US online retail. The opportunities in this industry for MSIS students are staggering.

Globally, annual e-commerce revenue was estimated to be about \$1.9 trillion in 2016 and is expected to top \$4 trillion by 2020, according to eMarketer. The industry is concentrated: the top 20 companies account for about half of industry revenue. Approximately 32,500 establishments (single-location companies and units of multi-location companies) share \$430 billion of this market.

Companies in this industry that hired Smith MSIS Graduates and their Job Titles:

- **Amazon** - Data Analyst
- **Walmart Technology** - Developer / Technology Analyst

Top 20 U.S. Companies in this industry likely to need MSIS talent:

1. **Amazon.Com, Inc. Seattle, WA**
2. Liberty Interactive Llc, Englewood, CO
3. Macys.Com, Inc., Cincinnati, OH
4. Express Scripts, Inc., Saint Louis, MO
5. Medco Health Solutions, Inc., Franklin Lakes, NJ
6. Chinos Holdings, Inc., New York, NY
7. Chinos Intermediate Holdings B, Inc. , New York, NY
8. Caremark Rx, Inc., Nashville, TN
9. Tib Holdings Llc, New York, NY
10. Fullbeauty Brands, New York, NY
11. Zulily, Llc, Seattle, WA
12. Epantry, Llc, San Francisco, CA
13. Vitamin Shoppe Industries, Inc., North Bergen, NJ
14. Jill Acquisition Llc, Quincy, MA
15. Chelsey Direct, Llc, New York, NY
16. Caremark International, L.L.C., Northbrook, IL
17. Caremark, L.L.C., Northbrook, IL
18. Duluth Holdings Inc., Belleville, WI
19. Etsy, Inc., Brooklyn, NY
20. Stamps.Com Inc., El Segundo, CA



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Internet & Mail Order Retail (Continued)

Industry Resources

Industry Associations to Follow

- [Internet Marketing Association](#)
- [Search Engine Marketing Professional Association](#)
- [eMarketing Association](#)
- [American Marketing Association](#)
- [Web Marketing Association](#)
- [Interactive Marketing Association Alliance](#)

Industry Websites

- [American Catalog Mailers Association](#)
- [Chain Store Age](#)
- [Data & Marketing Association \(DMA\)](#)
- [Internet Retailer](#)
- [National Retail Federation](#)
- [Shop.org](#)

Industry Trends

Technology Alliances — Internet retailers are allying with marketing analytic firms to better mine customer data. Alliances with companies that offer secure payment processing are helping allay consumer privacy fears.

One-to-One Marketing — Marketing segmentation techniques have become so specialized that retailers can personalize catalogs and websites. Consumer-centric content and messages based on past shopping behavior are replacing generic advertising messages.

Key Growth Opportunities

Increasing Online Purchase Rates — Some industry estimates suggest that as many as two-thirds of internet shoppers place items in their carts but then abandon them without buying. Analysis of buyer behavior, prediction and recommendation systems, website design strategies and multi-channel marketing influencer systems (email, social, etc.) are in high demand.

Multi-Channel Marketing — According to Forbes, customers who respond to multi-channel marketing (e.g. print catalog consumption followed by online ordering) are more valuable to retailers than single-channel customers (web-only). Multi-channel marketing provides unique, data-driven opportunities for customer segment differentiation and nuanced marketing.

Leveraging Customer Data — Internet retailers have and can generate a wealth of customer-specific data that can be used to improve decision-making through data warehousing, sales forecasting, statistical modeling, and geographic analysis. These analyses can be used to personalize marketing efforts through targeted mailings and customized emails. Boosting email relevance begins with customer segmentation.



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Internet & Mail Order Retail (Continued)

Creating Loyalty Programs — Generating repeat business is important to internet retailers. Customer reward programs, such as frequent shopper discounts and online coupons, are being used by some retailers. Online retailers are using the techniques of mainline retailers in looking at the long-term value of customers rather than the short-term sale. Frequent buyers may also be the first to be offered new merchandise or sale prices as a reward for loyalty.

Critical Resources

Predictive Analytics Experts: Shopping Cart Modeling, Social Media Sentiment Analysts, Forecasting Methods, Behavioral Modeling, ROC and Lift Analysis

Database Experts: Data Warehousing, Data Mining, SQL Query Design, Data Security

Data Security Experts: Data Encryption Systems, SaaS Integration, Transaction Token Handling, Fraud Prediction and Detection

Project Management Experts: System Modeling, System Planning, System Testing

Application Developers: Mobile Platform Developers, Push Marketing Systems Developers, Social Interaction and Feedback Systems Developers

Call Preparation Questions

What types of products does the company specialize in?

Most catalog and internet retailers specialize in a product line, such as Lands' End in clothing, but many have started to branch into categories other than their original specialty.

How many distribution centers does the company operate?

Phone and online orders are filled by shipping products from centralized distribution centers.

To what extent does the company offer both catalog and online shopping?

Most catalog companies have broadened their capabilities to include internet shopping.



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Finance & Insurance

Companies in this industry engage in financial transactions and create, liquidate, purchase, and sell financial assets such as securities, bonds, and insurance. Major US based finance and insurance companies include AIG, Bank of America, Citigroup, Fidelity, Goldman Sachs, JPMorgan Chase, MetLife, and Wells Fargo. Major financial and insurance products and services include loans, financial services, investment advice, insurance products, transactions processing, trading financial instruments, and asset management.

Companies in this industry that hired Smith MSIS Graduates and their Job Titles:

- **American International Group (AIG)** - Technology Analyst
- **Bank of America** - Technology Analyst, Data Analyst, Business Analyst, Sample Data Developer
- **Fannie Mae** - Financial Engineer, Data Insights & Reporting Analyst, System Analyst/Application **Developer**, Financial Reporting Analyst
- **Freddie Mac**
- **Goldman Sachs** - Technology Analyst
- **JP Morgan Chase** - Business Analyst
- **Wells Fargo** - Regional Vice President

Top 20 U.S. Companies in this industry likely to need MSIS talent:

1. United Health Group, Minnetonka, MN
2. General Electric, Boston, MA
3. **Fannie Mae, Washington DC**
4. **JP Morgan Chase, New York, NY**
5. **Wells Fargo, San Francisco, CA**
6. **Bank of America, Charlotte, NC**
7. Anthem, Inc. Indianapolis, IN
8. Citigroup, New York, NY
9. Oppenheimer Funds, New York, NY
10. **Freddie Mac. McLean, VA**
11. Metlife, New York, NY
12. Aetna, Hartford, CT
13. Prudential Financial, Newark, NJ
14. Humana, Louisville, KY
15. Kaiser Foundation Health Plan, Oakland, CA
16. **American International Group (AIG), New York, NY**
17. Highmark, Pittsburgh, PA
18. Liberty Mutual, Boston, MA
19. Centene Corporation, St Louis, MO
20. CIGNA, Bloomfield, CT

Industry Resources

Industry Associations to Follow

- [American Banker](#)
- [Insurance Information Institute](#)
- [Mortgage Bankers Association](#)
- [National Venture Capital Association](#)

Industry Websites

- [Federal Trade Commission](#)
- [Investor's Business Daily](#)
- [New York Stock Exchange](#)
- [NASDAQ](#)



Finance & Insurance (Continued)

Industry Trends

Diverse Product Mix — The relaxation of regulations that separated brokerage, insurance, and banking has led to the creation of large financial services companies like JPMorgan Chase, Bank of America, Citigroup, and American Express that offer a large range of investment products. Products include financial planning services, investment advisory, and stock brokerage for the purpose of capturing all of a customer's financial business.

Identity Theft: Increasing Threat — Identity theft is one of the fastest growing financial crimes in the US. An estimated \$16 billion was stolen from 15.4 million US consumers in 2016. Cyber crime is also rising, with payment card fraud, including credit, debit, and ATM card fraud, the most common, claiming a third more victims than other types of fraud.

Renewed Focus on Risk Management — High levels of risk taking, primarily related to mortgages and mortgage-backed securities, led to widespread losses in the financial and insurance sector during the late 2000s. Industry leaders have called for new business models that reflect sounder risk management principles and increased transparency of risk. Financial firms will likely expand their risk management units to increase long-term profitability.

Key Growth Opportunities

Internet Improves Service — The Internet allows firms to increase their level of service by giving customers greater access to products, services, and information. Online information-collaboration systems can enable workers to communicate information faster and with ease. Already, a majority of personal and small business commercial lines are processed electronically via online systems, using the Internet or proprietary systems.

Data Analytics — Financial and insurance firms may have their own in-house research team that conducts in depth research and analysis. They may also pass on projects to third party firms for analysis and data mining. By using specialized software to analyze the information gathered, research analysts can help firms with forecasting, portfolio analysis, and understanding consumer trends.

Critical Resources

Business Analysts & Project Managers: As technology becomes the primary interface between financial and insurance service providers and their customers, the need for professionals who can translate business requirements into IT project deliverables increases.



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Finance & Insurance (Continued)

Risk Analysts: Professionals who can define and measure risk of potential fraud, financial loss, and service delivery failure.

Application Developers: Most large firms develop custom software around their unique product lines to better protect custody of their client data. There is a large movement toward complete mobile access to financial products and insurance services.

Cyber Security Experts: Financial data and access to the systems that capture and store transactions are under constant attack. Firms must retain experts in intrusion detection, containment and compartmentalization of threat, audit and forensic evidence capture systems.

Business Intelligence / Data Analytics: Financial and insurance products are constantly being created to target market opportunities based on analytics. To identify potential risk pools and selling opportunities, firms must have internal capabilities to mine data to find product features and the customer segments that are likely to buy them.

Call Preparation Questions

What challenges have changes in technology created for the company?

The rapid evolution of computer technology allows customers to engage in financial transactions without broker intervention.

How are improvements in information systems benefiting the company?

The Internet allows firms to increase their level of service by giving customers greater access to products, services, and information.

What growth plans does the company have?

Growth often comes through acquisitions in the finance and insurance sector. Acquisitions require IT and Business Professionals who can make business determinations about which systems to integrate & how to integrate, as well as which systems and people to let go & how to structure that process.

To what degree does the company plan to increase the automation of its processes?

The industry is capital-intensive and highly automated: annual revenue per employee averages around \$550,000.

How many acquisitions has the company made during the last few years?

Acquisitions can absorb competition, allow new technologies be bought, and expand product or service capabilities.



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Non-Profit Organizations

Institutions in this industry include grantmaking foundations, giving services, advocacy groups, civic clubs, and social organizations. Major US institutions include AARP, the American Cancer Society, the Nature Conservancy, and the Pew Charitable Trusts. Nonprofits can be classified into service categories, including the arts, culture, and humanities; education; environment and wildlife; health; human services; international and foreign affairs; membership benefit; and public benefit. Customers of nonprofits include the clients they serve, as well as donors who support them financially and volunteers who contribute their time and talents to them.

Companies in this industry that hired Smith MSIS Graduates and their Job Titles:

- **American Institute of Research** - Data Analyst, QC Analyst, Technical Project Coordinator, System Analyst

Top 20 U.S. Companies in this industry likely to need MSIS talent:

1. AARP, Washington, DC
2. American Cancer Society, Atlanta, GA
3. The Nature Conservancy, Arlington, VA
4. Pew Charitable Trust, Philadelphia, PA
5. Research Foundation SUNY, Albany, NY
6. Inova Health System Foundation, Falls Church, VA
7. PATH, Seattle, WA
8. Lee Memorial Health System Foundation, Ft Meyers, FL
9. YMCA of the USA, Chicago, IL
10. Partnership for Supply Chain Management, Arlington, VA
11. Compassion Int'l, Colorado Springs, CO
12. American Heart Association
13. Family Health Int'l (FHI360), Durham, NC
14. **American Institutes for Research (AIR), Washington, DC**
15. The Ford Foundation, New York, NY
16. Rotary International, Evanston, IL
17. The Leukemia & Lymphoma Society, Rye Brook, NY
18. JDRF International, New York, NY
19. Cystic Fibrosis Foundation, Bethesda, MD
20. The United Way Worldwide, Alexandria, VA

Industry Resources

Industry Associations to Follow

- [Association of Fundraising Professionals](#)
- [National Council of Nonprofits](#)
- [Society for Nonprofit Organizations](#)
- [The Council on Foundations](#)
- [The Foundation Center](#)

Industry Websites

- [American Institute of Philanthropy](#)
- [BBB Wise Giving Alliance](#)
- [Guide Star](#)
- [National Center for Charitable Statistics](#)
- [Network for Good](#)
- [The NonProfit Times](#)



Non-Profit Organizations (Continued)

Industry Trends

Public Confidence and Transparency — creating assurances to donors about where finances are being invested. Nonprofits are being encouraged to conduct annual ethics audits and are beginning to require CEOs to certify their organization's annual financial statements.

Purchased Fund-raising Lists — Letter, email, and telephone fundraising campaigns increasingly rely on donor lists bought from other organizations. Large national nonprofits often sell access to their donor lists to smaller nonprofits. Additionally, many nonprofit organizations exchange donor lists with other nonprofits. Brokers and list managers have become sophisticated at building lists that target potential donors according to desirable demographic characteristics.

Charity Gaming — Most states in the US allow nonprofits and charities to raise donations through some form of gambling. Rules can vary from state to state.

Key Growth Opportunities

Favorable Demographics — Older people and their estates represent a significant portion of the donor base for many nonprofits. Americans 65 and over are the fastest-growing segment of the population, projected to increase by more than 50% between 2015 and 2030.

Internet Donations — Many nonprofits have made it easy for donors to contribute over secure websites. Consequently, online giving has joined more traditional channels as a mission-critical part of the fund-raising mix. Donating online is often more efficient than offline and can help charities reduce administrative costs. Nonprofits seem to have the most success when they combine traditional appeals, such as direct mail, with the option to give electronically.

Social Networking — Some nonprofits are creating and maintaining profiles on online social networking sites to recruit new staff members and volunteers, engage audiences interested in their cause, build supporter lists, and raise money. Some of the most popular social networking sites include Facebook and Twitter. Nonprofits may also use professional online networks, such as LinkedIn, and issues-focused networks, like Change.org.

Critical Resources

Non-Profit Organizations must be proficient in each of these activities to survive:

Data Analytics Experts for Audience Segmentation

Promoting the Cause - Nonprofits must be able to hone and customize the message in ways that resonate with key audience segments and communications vectors.



Non-Profit Organizations (Continued)

Developing Large Multifaceted Donor Participation Programs - reaching beyond low and high-dollar fundraising initiatives to include participation in policy and governance board participation and strategic partnership development programs.

Database Developers and Administrators

Ensuring Accountability - avoiding scandal related to data breaches and providing transparency to donors regarding tracking spending and impact

Maintaining Donor Information Databases - individuals may be induced to donate again if the organization can demonstrate that it's serving the cause well. Nonprofits maintain databases of individual donor profiles and draw on that information to structure future solicitation requests.

Website and Mobile App Developers

Developing Comprehensive Websites - websites are kept current with the latest developments, analysis, and commentary to encourage donors to log in frequently for the latest news.

E-commerce Transaction Processing - websites actively solicit donations and accept donations online.

CRM Systems Experts

Managing Volunteer Staff - most nonprofits rely heavily upon volunteer participation to implement the programs and events they help fund. Tracking, managing and recruiting volunteers is an essential capability.

Staging Fund-raising Events - promotional events are significant for both raising money and for publicizing the nonprofit's goals.

Call Preparation Questions

- **How does the nonprofit deal with lower revenue during an economic slowdown?**
Charitable contributions typically shrink in difficult economic times.
- **How reliant is the nonprofit on large donors?**
Many nonprofits depend on a few major donors for a large share of revenue.
- **How does the organization tailor fund-raising appeals to older audiences?**
Older people and their estates represent a significant portion of the donor base for many nonprofits.
- **To what extent does the nonprofit rely on internet-generated donations?**
Many nonprofits have made it easy for donors to contribute over secure websites.
- **What role does social media play in the organization's outreach strategy?**
Some nonprofits are creating and maintaining profiles on online social networking sites to recruit new staff members and volunteers, engage audiences interested in their cause, build supporter lists, and raise money.



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Healthcare Technology

There are two primary focal areas of healthcare IT investment today. Implementing Healthcare IT using Electronic Health Records (EHR), and enabling telemedicine using high-speed data networks to distribute medical images and video. Using high-speed networks, high-quality PET, MRI, CAT, and x-ray images can be forwarded seamlessly from the point of capture to specialized diagnostic staff in remote locations, potentially improving health outcomes while reducing cost. The federal government is offering financial incentives for the implementation of healthcare IT and EHR.

Companies in this industry that hired Smith MSIS Graduates and their Job Titles:

- **CNSI** - Systems Analyst, Business Analyst, Developer and Architect, Software Engineer
- **Dr. First** - Integration Engineer/ Technical Project Manager
- **EMC** - Research Scientist, Program Manager
- **Xerox** - IT Service Delivery Analyst

Top 20 U.S. Healthcare IT companies in this industry likely to need MSIS talent:

1. Optum, Eden Prairie, MN
2. Cerner Corp, Kansas City, MO
3. McKesson, Alpharetta, GA
4. Dell Healthcare, Round Rock, TX
5. Cognizant, Teaneck, NJ
6. Philips Healthcare, Andover MA
7. **Xerox Healthcare, Norwalk, CT**
8. Siemens Healthcare, Malvern, PA
9. Epic Systems Corp, Verona, WI
10. Allscripts, Chicago, IL
11. Emdeon, Inc., Nashville, TN
12. CSC, Falls Church, VA
13. Conifer Health Solutions, Frisco, TX
14. Leidos Health, Reston, VA
15. Nuance Communications, Burlington, MA
16. **EMC, Hopkinton, MA**
17. Infosys, Rockville, MD
18. Athenahealth, Watertown, MA
19. Wolters Kluwer Health, Philadelphia, PA
20. 3M Health Information Systems, Salt Lake City, UT

Top 20 U.S. Healthcare Systems in this industry likely to need MSIS talent:

1. HCA Holdings, Nashville, TN
2. Tenet Healthcare Corp, Dallas, TX
3. Community Health Systems (CHS), Franklin, TN
4. Davita, Inc., Denver, CO
5. Sutter Health, Sacramento, CA
6. Fresenius Medical Care, Waltham, MA
7. Laboratory Corporation of America (LABCORP), Burlington, NC
8. Partners Healthcare, Boston, MA
9. Mayo Clinic, Rochester, MN
10. Cleveland Clinic, Cleveland, OH
11. Banner Health, Phoenix, AZ
12. Quest Diagnostics, Madison, NJ
13. Kindred Healthcare, Louisville, KY
14. Genesis Healthcare, Lake Forest, CA
15. Lifepoint Health, Brentwood, TN
16. Hospital Corporation of America (HCA), Nashville, TN
17. Northwell Health, New Hyde Park, NY
18. Sentara Healthcare, Norfolk, VA
19. Health Management Associates, Naples, FL
20. Geisinger Health, Danville, PA



Healthcare Technology (Continued)

Industry Resources

Industry Associations to Follow

- [Agency for Healthcare Research and Quality](#)
- [America's Health Insurance Plans \(AHIP\)](#)
- [American Association of Healthcare Administrative Management \(AAHAM\)](#)
- [American Health Information Management Association](#)
- [American Hospital Association](#)
- [American Medical Association \(AMA\)](#)
- [Consumer Healthcare Products Association](#)
- [Pharmaceutical Research and Manufacturers of America](#)

Industry Websites

- [Centers for Medicare & Medicaid Services](#)
- [Modern Healthcare](#)
- [Managed Healthcare Executive](#)
- [US Department of Health & Human Services](#)
- [World Health Organization](#)
- [The Journal of AMA](#)
- [Institute of Medicine](#)
- [National Center for Health Statistics \(NCHS\)](#)
- [Healthcare Infomatics](#)

Industry Trends

Increasingly Informed Patients — Many patients use the Internet to access websites such as WebMD to research diseases and symptoms, and join online communities to discuss health issues and concerns.

Employment Continues to Rise — Employment in the sector is expected to increase about 19% by 2024 (from 2014), with the strongest growth expected in health care **support occupations**, health care practitioners, and **technical occupations**.

Consolidation — Hospitals have been buying competitors, independent physician groups, and insurance companies, all to get a better handle on cost containment, **patient care data**, and revenue streams.

Outsourcing Services — To lower operating costs, hospitals and clinics are increasingly outsourcing in areas such as Information Technology to third-party providers.

Key Growth Opportunities

Health Information Technology — Health information technology (HIT) integrates electronic health records, decision support systems, and computerized physician order entry for medications. Hospitals and physicians that invest in HIT may be able to improve scheduling, lower nurse administrative time, improve drug use, and lower the risk of adverse drug reactions. The US government has put financial incentives in place to encourage the adoption of HIT as a way to ultimately improve medical care and lower costs. However, hospitals have found that



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Healthcare Technology (Continued)

development of HIT is complex and expensive and may outweigh eventual cost savings. Interoperability among providers is a barrier to success, as companies may use software programs that don't speak to each other.

Aging US Population — Health care spending per person for those over 65 is about three times as much as for the rest of the population. The US population 65 and older is expected to increase by 38% between 2015 and 2025.

Personalized Medicine — Personalized medicine uses a person's genetic profile to identify potential risk for diseases such as cancer, diabetes, heart disease, and kidney failure.

Preventive Medicine — Medical advances show that many disorders can be prevented or delayed through early intervention. Hospitals are hiring professionals tasked with overseeing a patient's stay and providing preventive care counseling to reduce readmissions, length of stay, and errors.

Telemedicine — Telemedicine allows doctors to consult with and treat patients who live in rural areas. It also lets patients see specialists who may be unavailable in a local market. Insurance companies are rolling out telemedicine consultations to their networks as a way to increase access to care and control costs.

Handheld Technology — Handheld devices such as GE's Vscan portable ultrasound will let doctors and emergency responders to gather medical data in the field and transmit it to a hospital or emergency room. Other devices such as smartphones and health applications are making inroads into the health care field as well.

Critical Resources

Website and Mobile App Developers for Personalized Medicine: Health providers and insurers both are trying to put tools in patient's hands so that they may more effectively manage their treatments between visits and to avoid more costly hospitalization.

Business Analysts and Project Managers: Healthcare systems integration projects are extremely complex due to the proliferation of highly customized HIT systems. As providers continue to merge and consolidate, a greater need for project managers with systems integration experience will follow.

Network Engineers and Systems Architects: Enabling the high-speed data networks that will make telemedicine possible is a critical need for the efficient delivery of medicine.



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Healthcare Technology (Continued)

Data Visualization and Data Mining Experts: Predictive modeling experts are needed to help health providers and insurers identify population dynamics that will influence both demand and availability of necessary service delivery options.

Call Preparation Questions

What is the company doing to computerize patient health care records?

Health information technology (HIT) integrates electronic health records, decision support systems, and computerized physician order entry for medications.

How have changes in population demographics affected company operations?

The aging US population both strains and presents opportunities for the American health care system over the next decade.

What opportunities does the company see in personalized medicine?

Personalized medicine uses a person's genetic profile to identify potential risk for diseases such as cancer, diabetes, heart disease, and kidney failure.

How has the organization altered its operational processes to protect the privacy of patient information?

The Health Insurance Portability and Accountability Act of 1996 (HIPAA) requires organizations to ensure that patient information is protected.

What investments in computer and communication technology will be necessary in the next decade for the company?

Wireless technology is expected to improve the quality of patient records and treatment.

What is the company's main motivation for investing in new technology?

Hospitals and physicians often invest in new technology to improve efficiency and reduce medical error risks.

What new technologies has the organization invested in?

Advances in computer technology have produced new diagnostic imaging systems like ultrasound, MRI, CAT, and PET that can detect abnormalities in their earliest stages.



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Advertising & Marketing Services

Internet advertising and marketing have rapidly evolved in recent years and now are essential to most businesses as e-commerce continues to expand. Social media sites, such as Facebook and Twitter, are increasingly important outlets. Agencies are creating sophisticated audience measurement tools that can verify how effectively their ads are reaching consumers across various online channels.

Trend: Marketers Focus on Tailoring Experiences for Customer Retention — About 60% of marketers in the US say they will focus on retention and loyalty in 2017 and nearly 90% of Fortune Global 500 executives think customer experience will be "the key battleground", according to a report by marketing technology firm Signal.

Marketers who use data analytics and identity resolution tools to understand a customer's behavior online and off, across all devices, stand to gain the most by delivering the right experience at the right time. **To derive the most benefit from the trend, marketers are choosing not to outsource customer data.** More than 80% believe maintaining ownership of that data is important, Signal reports.

Companies in this industry that hired Smith MSIS Graduates and their Job Titles:

- **ComScore** - Data Analyst

Top 20 U.S. Companies in this industry likely to need MSIS talent:

1. Omnicom Group, New York, NY
2. Acosta, Inc., Jacksonville, FL
3. Interpublic Group, New York, NY
4. Advantage Sales & Marketing, Irvine, CA
5. Groupon, Chicago, IL
6. WPP Group, New York, NY
7. Crossmark, Inc., Plano, TX
8. Clear Channel Outdoor Holdings, San Antonio, TX
9. Inventiv Group, Boston, MA
10. Valassis Communications, Livonia, MI
11. Sutherland Global Services, Pittsford, NY
12. Outfront Media, New York, NY
13. Lamar Advertising, Baton Rouge, LA
14. Daymon Worldwide, Stamford, CT
15. MDC Partners, New York, NY
16. Young & Rubicam, New York, NY
17. Maritz Holdings, Fenton, MO
18. Affinion Group Holdings, Stamford, CT
19. The Ogilvy Group, New York, NY
20. Acxiom Group, Conway, AR



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Advertising & Marketing Services (Continued)

Industry Resources

Industry Associations to Follow

- [American Advertising Federation](#)
- [American Association of Advertising Agencies](#)
- [American Marketing Association \(AMA\)](#)
- [Direct Marketing Association \(DMA\)](#)
- [Interactive Advertising Bureau \(IAB\)](#)
- [International Advertising Association \(IAA\)](#)

Industry Websites

- [Advertising Age](#)
- [Adweek](#)
- [Nielsen](#)
- [Radio Advertising Bureau](#)
- [Television Bureau of Advertising](#)
- [The Ad Council](#)
- [Video Advertising Bureau \(VAB\)](#)

Industry Trends

Search Engine Marketing (SEM)— Search engine marketing (SEM) is a major venue for advertisers and marketers. Optimization and search marketing that targets mobile internet users is becoming an increasingly important segment.

Targeted Marketing — The proliferation of media outlets, such as specialized cable channels, makes broadcasting to a national audience more difficult for advertisers. However, it allows more tightly targeted ads for a specific group of potential customers, thereby enabling smaller companies to advertise nationally. For example, a company can advertise a fishing lure on a cable channel that specializes in fishing.

Consolidation — To provide a complete range of services to customers, the large advertising companies have been built by acquisitions. Rather than absorbing acquired agencies into a larger organization, the advertising companies operate them mainly as separate entities.

In-Store Ads — Experts say in-store marketing is a growing trend. The systems are expensive, but retailers can subsidize costs by negotiating with vendors to feature their products. Retailers are starting to use tablets for in-store interactive promotions.

Native Advertising — Marking a shift in approach for the industry, nearly 70% of marketers believe that native advertising is an important form of online marketing and 20% believe it to be the future of digital advertising, according to a benchmark study conducted by digital media consultant 614 Group. Types of native advertising include content marketing, promoted tweets or Facebook posts, and ads that appear alongside online search results. Native advertising is advertising designed to work by being relevant to a user's online experience and by seeming less intrusive than other forms of advertising. About 80% of ad agencies surveyed use both their own website and social media sites for native ads. Because the industry places such importance on native advertising, many agencies are partnering with vendors that specialize in native ads.



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Advertising & Marketing Services (Continued)

Key Growth Opportunities

Global Market — Advertising companies have grown to be able to serve customers in foreign, as well as US, markets. Increasing trade globalization presents more opportunities for agencies with international capability.

Consulting Revenues — Advertisers are seeking new ways to sell products, such as market research, direct marketing, PR, package design, and brand-image consulting. These are more likely to be paid for through consulting fees, rather than traditional commissions on billings.

Offering Integrated Services — Some marketing companies are offering clients integrated services. Finding and recruiting agency staff who are cross-trained enough to deliver the integrated services remains a challenge. Large agencies offer such services via their acquired group companies.

Mobile Marketing — To expand the reach of advertising campaigns, many agencies are investing in technology related to mobile marketing. Technology that allows ads to be sent to mobile consumers based on their location represents a significant opportunity for advertisers and marketers.

Social Networking Commercialization — More marketers are using social media to support traditional advertising. Social media sites, such as Facebook and Twitter, allow brands to interact with consumers, build product awareness, and create new sales channels.

"Hyper-Local" Campaigns — Agencies may increasingly tailor national ad campaigns to appeal to regional and local audiences. Such "hyper-local" techniques may include incorporating city landmarks, local celebrities, and references to area sports teams. Through advances in online tracking technologies, internet users can see digital ads that are customized according to their location and viewing habits.

Key Growth Opportunities

Global Market — Advertising companies have grown to be able to serve customers in foreign, as well as US, markets. Increasing trade globalization presents more opportunities for agencies with international capability.

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Critical Resources

Search Engine Marketing (SEM)— Google Analytics experts who can develop evidence-based campaign strategies that target individual customer segments. Professionals who can produce statistically relevant AB testing scenarios, interpret the results and present them are needed.

Targeted & Native Marketing — Big Data Mining experts who can manipulate social media and other datasets so that audience segmentation models may be developed. Predictive and simulation modeling with shopping basket, neural network, sentiment analysis and other predictive modeling algorithms are needed skills.

Hyper-Local, Mobile and In-Store Ads — Mobile Application Developers, Project Managers and network engineers who can design, build and test deployment of targeted push marketing systems are needed.

Call Preparation Questions

What successes and challenges has the company had with internet marketing?

Many executives feel that the internet is altering the advertising landscape.

How much has the company invested in mobile marketing?

To expand the reach of advertising campaigns, many agencies are investing in technology related to mobile marketing.

How will the company respond to media audience fragmentation?

The proliferation of cable channels and magazines makes reaching a large audience harder for corporate customers.

How will the company be impacted if advertisers require more proof of effectiveness?

Measuring the effectiveness of advertising campaigns is still more art than science.

How does the company try to reach very specific consumer demographics?

Advertising has traditionally targeted broad market groups.

What is the company's social media strategy?

More marketers are using social media to support traditional advertising.



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Telecommunications (Wireless & Wired)

Companies in this industry provide services such as local and long-distance calling, internet access, and TV program distribution over fixed-line telecommunications networks. Major US companies include AT&T, Charter Communications, Comcast, and Verizon Communications.

Carriers are increasingly providing broadband services and upgrading local loops to fiber optic. Maintenance staff must be able to "see" into all aspects of the system and provide remote testing to isolate problems rapidly. Systems that can identify information about the customer, their services, billing, and collections are essential to quickly resolve consumer concerns.

Most carriers operate in an environment where competition for one or more of their services exists. Carriers package offerings to attract new subscribers, sell new services to existing customers, and diminish churn (loss of customers). Determining subscribers' base needs and desires is critical in packaging services, offering discounts, and selecting new service offerings.

Companies in this industry that hired Smith MSIS Graduates and their Job Titles:

- **China Telecom Americas** - Solutions and Delivery Associate, Network Analyst, System Analyst
- **Time Warner**, Business Process Analyst
- **Verizon** - Data Scientist

Top 20 U.S. Companies in this industry likely to need MSIS talent:

1. Comcast, Philadelphia, PA
2. **Verizon Communications, New York, NY**
3. Charter Communications, Stamford, CT
4. T-Mobile USA, Bellevue, WA
5. **Time Warner, Stamford, CT**
6. Sprint, Overland Park, KS
7. Dish Network, Englewood, CO
8. New Cingular Wireless, Redmond, WA
9. Cox Communications, Atlanta, GA
10. Nextel Communications, Reston, VA
11. Frontier Communications, Norwalk, CT
12. Level 3 Communications, Broomfield, CO
13. US Cellular, Chicago, IL
14. Altice USA, Bethpage, NY
15. Alltel, Little Rock, AR
16. Cequel Communications, Tyler, TX
17. Leap Wireless Int'l, San Diego, CA
18. Zayo Group, Boulder, CO
19. Virgin Media, New York, NY
20. Wideopenwest, Englewood, CO



Telecommunications (Continued)

Industry Resources

Industry Associations to Follow

- [FCC](#)
- [National Exchange Carrier Association](#)
- [National Telecommunications Cooperative Association](#)
- [US Telecom Association](#)
- [CTIA - The Wireless Association](#)
- [FCC Wireless Telecommunications Bureau](#)

- [GSM Association \(GSMA\)](#)
- [International Telecommunication Union \(ITU\)](#)

Industry Websites

- [Light Reading Mobile](#)
- [Total Telecom](#)
- [Wireless Week](#)
-

Industry Trends

Aggressive Pricing Strategies — Wireless carriers are aggressively lowering prices as the market becomes increasingly saturated and competition for new subscribers intensifies.

Mobile Broadband Gaining Dominance — A shift to mobile broadband networks (3G or above technologies) is occurring across the world, driven primarily by greater availability and affordability of smartphones and more extensive coverage.

Data Usage Soars — The proliferation of smartphones and other advanced mobile devices, along with faster mobile networks and an explosion of streaming services and apps, is driving massive growth in data usage. Mobile video traffic now accounts for more than half of all mobile data traffic.

Converged Services — The bundling of separate communications services in a single, customizable package is becoming increasingly popular among wireless providers as more customers seek simplified offerings. With convergence, multiple offerings are tied to one provider, allowing for a single customer service and billing interaction.

Wireless Carrier Productivity Exceeds Wired Carriers' — Wireless carrier productivity (output per employee) has been increasing at an average of about 15% per year, but wired productivity has increased at an average of less than 5% per year. While both have made investments and outsourced some labor-intensive functions like operator services, the older and larger physical plants of the wired providers require more maintenance and support workers.



Telecommunications (Continued)

Wired Access Lines Replaced — With the improved quality and reliability of wireless, consumers are increasingly giving up wired access lines in favor of using wireless and VoIP exclusively.

High-Speed Internet Growing — Consumers in many areas can choose from many high-speed internet providers. Wired carriers offer DSL over existing phone lines. Cable providers offer digital cable modems, and wireless providers offer various internet and multimedia services. To retain customers, wired carriers must offer competitively packaged services.

Key Growth Opportunities

Advertising Revenue — The mobile phone has become the "third screen" for advertisers, after TV and computers. Mobile is expected to surpass desktop internet advertising and become the primary internet advertising medium worldwide in 2017, according to Zenith. Outside the US, China is the leading mobile advertising market, followed by the UK. Operators are evaluating ways to advertise on mobile devices without being intrusive. Advertising on wireless devices offers great financial potential, and future advertising may subsidize wireless devices.

Smartphone Adoption in Developing Regions — Smartphone adoption is accelerating across the developing world, driven by falling device costs and rising incomes. At the end of 2016 about half of all global wireless connections were smartphones, up from 5% in 2010, according to GSMA Intelligence. That growth was largely due to smartphone adoption in emerging markets in Asia/Pacific and Latin America. By 2020 some 1.9 billion additional smartphones will be in use across the world, with most of that growth coming from developing regions.

Connected Devices, IoT — The number of "Internet of Things (IoT)" devices connected to the internet is forecast to reach 46 billion by 2021, up 200% from 2016, according to recent data from Juniper Research. These devices are connected easily and inexpensively through recent advances in technology, including wireless connectivity and smart sensors. Widespread adoption of IoT is expected across a variety of applications and industries, including wearable devices, smart appliances, and connected cars.

Ultra-Fast 5G Networks — The next generation of mobile technology is 5G, which will boost network coverage and reliability with average speeds of 100Mbps. 5G is designed to support the requirements of new applications such as the Internet of Things and could be commercially available as early as 2020. Smartphone sales and wireless subscription revenues in many countries have recently flattened or declined, and higher 5G speeds may prompt new demand for devices and services.



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Telecommunications (Continued)

Network Convergence — Telephone, video, and data communication are increasingly co-existing (or converging) within a single network. As a result, users are exchanging more rich content. Network, wireline, and wireless access and applications must become more advanced in order to meet such demands, and telecommunications providers that adopt the latest technology will have the competitive advantage.

VoIP Telephony — The industry is converting to voice over Internet protocol (VoIP) telephony. VoIP allows services to be provided over one set of wiring and switching fabric. Subscribers can implement multimedia services faster and at lower cost than with traditional technology. To take advantage of this opportunity, AT&T has announced plans to transition wireline customers in its 21-state area to services using VoIP technology by the end of 2020.

Fixed-Broadband in Developing Regions — Internet access in developing countries presents an enormous opportunity for wired telecommunications services providers. About 40% of households in developing countries have internet access, versus more than 80% of households in developed nations, according to the ITU. Meanwhile, nearly 60% half of the world's nearly 885 million fixed-line broadband subscriptions come from developing countries.

Wireless-Like Services on Wired Phones — To entice users to keep their wired phones, companies are adding features popular on mobile devices to home phones, like address books and text messaging. Equipment makers' latest home and office phones include video displays and a range of new features like in-home video baby monitoring, instant messaging, and access to email and the Web. Carriers are unveiling new products meant to replace the home phone and interact more easily with cell phones.

Critical Resources

Network Performance Monitoring: Carriers and transporters of data must monitor, detect and contain network service intrusions and disruptions. Machine Learning, Cyber Security Physical and Virtual Infrastructure, Big Data, GPS and GIS Data skills are needed.

Network Architecture: Design and implement network expansion and integration. Perform network modeling, analysis, and planning. May also design network and computer security measures. May research and recommend network and data communications hardware and software.



Telecommunications (Continued)

Network Security: Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. Encrypt data transmissions and erect firewalls to conceal confidential information as it is being transmitted and to keep out tainted digital transfers. Develop plans to safeguard computer files against accidental or unauthorized modification, destruction, or disclosure and to meet emergency data processing needs. Monitor use of data files and regulate access to safeguard information in computer files.

Call Preparation Questions

What role do mergers or acquisitions play in the company's growth strategy?

M&As can help companies expand services and geographic coverage.

What plans does the company have to enhance its wireless data offerings?

Many new services can be facilitated by higher network speeds.

How is the company preparing for the next generation of technology offerings?

Companies prefer to migrate to technologies that are backward-compatible with their current networks.

How competitive are VoIP offerings to the company?

Since many users carry portable computers with them, they can use "hot spots" for voice services.

How aggressively is the company selling advertising on cell phones (or experimenting with doing so)?

The cell phone is considered the consumer's third screen, after TV and the computer. Advertising is sold for both of the other screens. Companies are experimenting to make ads less intrusive



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Business Intelligence Software Development

Companies in this industry design, develop, publish, and support software used to collect, store, report, and analyze data from various operations of a business. Major US companies include MicroStrategy, QlikTech, SAS, and Tableau.

Users of BI software, who often analyze customer or sales prospect data, must meet rigorous compliance standards. Data breaches caused by hacker attacks or faulty coding can destroy a company's reputation. Software providers must allocate resources to developing and maintaining security measures and provide security training and support programs to customers.

New BI platforms are focused on business-led analytics and away from IT-led solutions. Users typically want agile, easy-to-use platforms for quick analysis of customer, partner, and employee data. Customers also demand mobile solutions.

Companies in this industry that hired Smith MSIS Graduates and their Job Titles:

- **DS Federal** - Database Administrator, Web Producer, Junior Data Analyst

Top 20 U.S. Companies in this industry likely to need MSIS talent:

1. SAS Institute, Cary, NC
2. Tableau Software, Seattle, WA
3. Netsuite, San Mateo, CA
4. Qlik Technologies, Radnor, PA
5. Microstrategy Inc, Tysons Corner, VA
6. Information Builders, Inc, New York, NY
7. TravelClick, New York, NY
8. Actuate, San Mateo, CA
9. Appian, Reston, VA
10. Webtrends, Portland, OR
11. Applied Predictive Technologies, Arlington, VA
12. Genscape, Louisville, KY
13. MatterSight Corp, Chicago, IL
14. Exponential Interactive, Emeryville, CA
15. Noetix Corp, Redmond, WA
16. Razorsight Corp, Reston, VA
17. DOMO, American Fork, UT
18. Dimensional Insight, Burlington, MA
19. Integrated Decisions and Systems, Minneapolis, MN
20. Magnetic Michigan, San Mateo, CA

Industry Resources

Industry Associations to Follow

- [Business Software Alliance](#)
- [Software & Information Industry Association](#)

Industry Websites

- [Computerworld](#)
- [PC Magazine](#)



Business Intelligence Software Development (Continued)

Industry Trends

Data Scalability — Data is generated in increasingly large volumes, and the ability to capture and store the bulk of transactional and interactional data is keeping pace. This "big data" trend creates both opportunities and challenges for business intelligence providers. Customers need to be able to make productive use of massive data stores, and BI software providers must scale capabilities accordingly.

Mobile Devices — Explosive growth in the use of smartphones and other Internet-enabled mobile devices helps shape demand for BI software. Companies in the industry focus on enhancing functionality, graphics, performance, interactivity, support, and security for mobile users.

Key Growth Opportunities

Data Discovery Visualization — Customer preference is driving demand for visual data discovery tools over traditional business intelligence outputs. Where report generation has previously been the standard, ad-hoc querying and other tools are becoming more commonplace methods of viewing data analysis. Self-service data discovery tools allow business users -- instead of IT departments -- to drive data discovery and analysis.

Cloud Computing — As technology advances, cloud-based business intelligence software is an increasingly viable way for development companies to meet customer demand for off-premise solutions.

Broader Use of Analytics — More types of users are taking advantage of tools to analyze data. Where BI reports were previously used by analysts or managers, interactive dashboards and tools allow executives, customer service representatives, suppliers, external customers, and other users to benefit from insights provided through business analytics.

Critical Resources

Data Analytics Professionals: BI Software developers need team members with a solid working knowledge of statistical analysts algorithms and the ability to test and validate output to look for bad data, data corruption and misleading representation of results in output.

Big Data Experts: BI Software is increasingly processing and interpreting data from diverse and distinct information channels, such as order history combined with social media sentiment analysis. Mining and attaching an actionable meaning to diverse data points is valuable insight.



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Business Intelligence Software Development (Continued)

Project Managers: BI Software tends to be modular and customizable to clients needs. Integration and support requires solid project management systems to produce reliable customer satisfaction.

Data Visualization and Dashboard Developers: BI tools rely heavily upon easy to use dashboard tools that produce data visualizations with impact on decision-making.

Database Experts: Data integrity is essential to BI applications - software developers must be expert in designing data systems that are robust and secure.

Call Preparation Questions

How does the company mitigate fluctuations in revenue from licensing fees?

Revenue for business intelligence software companies comes mainly from licensing fees and technical support contracts and may fluctuate during the year.

What key factors differentiate the company from its competition?

The rapid development of new business intelligence products creates a highly competitive marketplace.

How does the company manage data privacy concerns?

Business intelligence software companies must take care to secure customer data sets.

What new ways to present BI data look most promising to the company?

Customer preference is driving demand for visual data discovery tools over traditional business intelligence outputs.

How has the emergency of cloud computing affected the company's development strategy?

As technology advances, cloud-based business intelligence software is an increasingly viable way for development companies to meet customer demand for off-premise solutions.

What new use cases has the company identified in recent years?

More types of users are taking advantage of tools to analyze data.



ROBERT H. SMITH SCHOOL OF BUSINESS

Business & Professional Associations

Executive Overview

Services that associations offer can also be lucrative opportunities for other for-profits. Companies in the private sector offer industry conferences, education, research, and lobbying that compete with association offerings. To compete effectively with private companies, associations invest in research and market intelligence to help position themselves as the "trusted source" for industry information.

Top 20 U.S. Companies in this industry likely to need MSIS talent:

1. American Chemical Society Washington DC
2. American Petroleum Institute (API), Washington, DC
3. National Education Association of the U.S. (NEA), Washington DC
4. National Telecommunications Cooperative Association, Arlington, VA
5. American Medical Association, Chicago, IL
6. CFA Institute, Charlotte, VA
7. American Institute of Certified Public Accountants, Durham, NC
8. National Association of Realtors, Chicago, IL
9. Pharmaceutical Research And Manufacturers Of America, Washington, DC
10. American Bar Association, Chicago, IL
11. American Dental Association, Chicago, IL
12. American Hospital Association, Chicago, IL
13. American Psychological Association, Washington, DC
14. Society for Human Resource Management, Alexandria, VA
15. American Association for the Advancement of Science, Washington, DC
16. Consumer Technology Association, Arlington VA
17. National Restaurant Association, Washington, DC
18. Chamber of Commerce of the United States, Washington, DC
19. American Bankers Association, Washington, DC
20. National Association of Home Builders, Washington, DC
21. National Retail Federation, Washington, DC

Industry Resources

- [American Society of Association Executives](#)
- [Association Meetings](#)
- [Association News](#)
- [Association Trends](#)
- [Center for Exhibition Industry Research](#)
- [Convention Industry Council](#)
- [Meetings & Conventions](#)



Business & Professional Associations (Continued)

Industry Trends

Challenges: Revenue Tied to Industry Health — A business association's performance is directly tied to the health of the industry it represents. The majority of business associations operate regionally or locally and depend on small to midsized businesses for funding. During industry downturns, smaller companies can be driven out of business, affecting membership and contributions; larger businesses may decrease contributions or cut convention and trade show participation.

Association Consolidation — With overlapping goals and objectives, associations are merging to create larger, stronger organizations. By combining with like groups, associations can develop bigger membership bases and realize higher trade show attendance, in addition to more substantial budgets and greater political influence. The American Petroleum Institute (API) and America's Natural Gas Alliance (ANGA) combined as a single organization under the API banner in 2016. The American Horticulture Association, the Craft and Hobby Association (CHA); the Hearth, Patio, and Barbecue Association (HPBA); the Vision Council of America (VCA); and the North American Meat Institute (NAMI) all were formed in mergers of independent associations.

Rising Wages — To retain professional staff, associations have had to increase wages faster than most businesses. Salaries for association workers increased by about 25% between 2006 and 2015. Many association workers generally enjoy higher than average wages, as because association jobs are professional and require a college degree. Many associations have increased salaries significantly to remain somewhat competitive with private companies.

Trade Shows and Events — Trade shows and exhibitions are important vehicles for associations to hold membership meetings, showcase new products and services, and generate revenue. Trade show attendance may drop during economic slowdowns as businesses and professional organizations re-evaluate budgets and expensive trade shows and conventions are postponed or canceled as a result. Some organizations are replacing face-to-face meetings with virtual meetings and conference calls.

Critical Resources

Targeting Growth Sectors — Associations can reduce reliance on membership dues by offering new services that target industry growth sectors. Some organizations are creating stand-alone, for-profit, subsidiaries for new ventures. Through a separate business, the National Association for Chain Drug Stores launched electronic prescription writing services that link physicians and drugstores.



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Business & Professional Associations (Continued)

Use of Digital Platforms — Associations can use websites, mobile apps, and social media platforms to communicate with members more creatively and effectively. Websites linking players within a supply chain can provide valuable connections for smaller companies that may lack the funds to attend trade shows. Associations can increase participation in educational courses and smaller meetings by using webinars or virtual conferencing. When conducting industry research, online surveys can be more cost-effective and result in a higher response rate. Mobile sites and apps and social media also allow associations to communicate urgent information to large memberships quickly and efficiently.

Career Guidance — Associations can add value to individual and corporate members by offering career guidance centers. As industries evolve and job descriptions change, associations can help retrain members. Job banks help link recruiting businesses and job seekers, and continuing education helps members improve skills. Career guidance centers can also become revenue-generators for associations that charge for job listings or to post resumes.

Call Preparation Questions

- **How does the industry's economic health affect the association's performance?**
A business association's performance is directly tied to the health of the industry it represents.
- **How does industry employment affect the association's financial health?**
Job growth is critical to drive total membership and cash flow from membership fees for professional associations.
- **What is the association's biggest competitive threat?**
Associations face increasing competition for many member services from organizations within the private sector.
- **What are some of the association's most successful partnerships?**
By collaborating with other organizations with similar interests and complementary skills, associations can further industry goals more effectively.
- **What are the association's biggest growth opportunities?**
Associations can reduce reliance on membership dues by offering new services that target industry growth sectors.
- **What is the association's internet, mobile and social media strategy?**
Associations can use websites, mobile apps, and social media platforms to communicate with members more creatively and effectively



ROBERT H. SMITH SCHOOL OF BUSINESS

Managed Application and Network Services

Companies in this industry provide application hosting and data storage services, data processing, time-sharing computing services, and related infrastructure and network services. Major US companies include Amazon Web Services, Equinix, Microsoft's Azure unit, Rackspace, and Windstream. Competition is heating up among big technology companies that are spending aggressively on data centers that run the world's businesses in the cloud. Amazon, Microsoft, and Google spent a combined \$31.5 billion in capital expenditures and capital leases in 2016, up 22% from 2015, according to data from company filings collected by The Wall Street Journal.

Companies in this industry that hired Smith MSIS Graduates and their Job Titles:

- **Amazon** - Program Manager, Business Intelligence Engineer
- Fidelity Information Systems

Top 20 U.S. Companies in this industry likely to need MSIS talent:

1. **Amazon Web Services, Seattle, WA**
2. Conduent Business Services, Dallas, TX
3. Windstream Holdings, Little Rock, AR
4. Equinix, Redwood City, CA
5. Akamai Technologies, Cambridge, MA
6. Iqor Holdings, New York, NY
7. Rackspace Hosting, San Antonio, TX
8. DST Systems, Kansas City, MO
9. Liberty TripAdvisor Holdings, Englewood, CO
10. Change Healthcare, Nashville, TN
11. **Fidelity Information Services, Jacksonville, FL**
12. NTT Data International, New York, NY
13. Sungard Availability Services, Wayne, PA
14. PayPal Global Holdings, Mountain View, CA
15. Fiserv Solutions, Brookfield, WI
16. First Data Resources, Omaha, NE
17. Ancestry.com Holdings, Provo, UT
18. Merrill Communications, St Paul, MN
19. First Data Merchant Services, Atlanta, GA
20. McKesson Technologies, Alpharetta, GA

Industry Resources

Industry Associations to Follow

- [Association for Data Center Management Professionals](#)
- [Internet Infrastructure Coalition](#)
- [The Green Grid](#)

Industry Websites

- [Data Center Journal](#)
- [Data Center Knowledge](#)



Managed Application and Network Services (Continued)

Industry Trends

Growing Demand for Cloud Computing — Customers continue to demand more sophisticated and fully featured cloud computing services. Demand for Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) is being driven by companies that increasingly want to offer advanced services and hosted applications to their own customers. Technology startups especially need low-cost providers of advanced data hosting and processing services to build new online services without the expense of maintaining their own data infrastructure.

Fewer, Bigger Data Centers — As server and networking technology improves, the number of data centers should decline while the size of the average data center increases. The total number of data centers in the US is expected to peak at 8.6 million in 2017, and will then begin to fall, according to IDC. The amount of data center space worldwide, meanwhile, will grow from about 1.58 billion square feet total in 2013 to 1.94 billion square feet in 2018. The evolution in data centers is being driven by virtualization technologies that allow companies to consolidate server assets, eliminating the need to have many smaller data centers.

Key Growth Opportunities

Green Data Centers — Building more energy efficient data centers can help lower operating costs and could help save the environment. Electricity needed to power servers, networking equipment, and the cooling systems required to keep it all running efficiently can account for up to 40% of operating costs. Reducing that power consumption through new, energy efficient equipment and better data center designs means lower costs and a more sustainable operation. The green data center market is expected to grow at a compound annual growth rate of more than 25% through 2019, according to Technavio.

Increased Demand for Virtualization — Data centers can provide more service from existing facilities through increased use of virtual servers. Modern servers are so powerful they can run multiple software copies concurrently, making it appear that there are more servers available for customer use. Virtualization also allows companies to offer additional services without the need to purchase and install new physical equipment. By 2019, more than four-fifths (86%) of all workloads will be processed in cloud data centers, according to Cisco.

On-site Power Generation — Most data centers run on electricity that comes off the grid, but some have experimented with generating their own power using on-site generators. Such generators can be fueled by natural gas, which has some advantages over diesel as a fuel source. The current natural gas production boom in the US has driven down prices, and gas delivered via underground pipelines can be more reliable than diesel delivered by truck during natural disasters such as hurricanes.



ROBERT H. SMITH SCHOOL OF BUSINESS

Managed Application and Network Services (Continued)

Critical Resources

Cloud Vendor Management Skills: Traditional data center skills won't go away, but there is a greater need for skills on how to manage cloud vendor relationships as well as aligning the cloud to the overall goals of the business

Data Architects and Business Analysts: Data centers struggle with breaking down information silos within their operations environment. With increased virtualization, lines are being blurred between traditional IT network operations, physical environment maintenance and service delivery. Architecture-oriented roles and business analysts are seen as critical in order to pull all of these parts of the ecosystem together and help them talk to each other

Project Managers and Product Managers: Making the integration and onboarding process for new customers is a key component to the successful growth of platform service providers.

TEKsystems' annual survey indicates that programmer and developer skill sets are the hardest to place, and have remained so for over the past three years. For 2015, software engineers were the second most difficult role to fill, while architects, project managers and security specialists came in third, fourth and fifth respectively.

Call Preparation Questions

How does the company determine how much to invest in new equipment and facilities?

The equipment and infrastructure needed for data center operations can be costly to build and maintain.

How does the company plan for fluctuations in energy costs?

Data center operation requires large amounts of electricity, so any fluctuation in energy costs can have a significant impact on profitability.

What is the company's strategy for green technology investment?

Building more energy efficient data centers can help lower operating costs and could help save the environment.

What percentage of server workloads are handled by virtual servers?

Data centers can provide more service from existing facilities through increased use of virtual servers.

What opportunities to generate revenue from outside the US look most promising to the company?

The data center services industry will grow as demand for data hosting and processing increases in developing economies.



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Software and Software as a Service SaaS

Companies in this industry design and publish computer software. Major companies include US-based Activision Blizzard, Adobe Systems, IBM, Microsoft, Oracle, Salesforce.com, and Symantec.

Evaluating Appropriate Development Tools

Companies must choose the development tools that are best for a particular project. Some programming languages are better than others for specific types of programs. In addition to considering the most appropriate development language, companies must consider the availability of programmers familiar with the language.

Improving Project Coordination

The efficiency and quality of software development depends heavily on close coordination among programmers or teams of programmers, because software is typically written as modules. Development starts with detailed road maps and specifications, but these often must be adjusted as difficulties or opportunities arise. A variety of project management systems are used to shepherd software development.

Companies in this industry that hired Smith MSIS Graduates and their Job Titles:

- **Adobe Systems** - Agile Process & Tools Analyst
- **Electronic Arts** - Data Analyst
- **Fidelity National Information Services**
- **FIS Data Systems** - Technology Analyst
- **Microsoft** - Premier Field Engineer
- **SAP America** - Business Reporting Specialist
- **Synopsys Inc** - Security Analyst

Top 20 U.S. Companies in this industry likely to need MSIS talent:

1. **Microsoft, Seattle, WA**
2. Oracle, Redwood City, CA
3. **Fidelity National Information Services, Jacksonville, FL**
4. VMWare, Palo Alto, CA
5. Goodrich Corporation, Charlotte, NC
6. Activision Blizzard, Santa Monica, CA
7. **SAP America, Newtown Square, PA**
8. Epicore Software, Austin, TX
9. **Adobe Systems, San Jose, CA**
10. **Electronic Arts, Redwood City, CA**
11. Intuit, Mountain View, CA
12. Cerner Corporation, Kansas City, MO
13. Oracle Systems, Redwood City, CA
14. Avaya, Inc, Santa Clara, CA
15. Symantec Corporation, Mountain View, CA
16. Citrix Systems, Fort Lauderdale, FL
17. **FIS Data Systems, Collegeville, PA**
18. **Synopsys Inc, Mountain View, CA**
19. Red Hat, Inc., Raleigh, NC
20. Salesforce.Com, San Francisco, CA



Software and Software as a Service SaaS (Continued)

Industry Resources

Associations and Events to Follow

- [Business Software Alliance](#)
- [CompTIA](#)
- [Electronic Frontier Foundation](#)
- [Entertainment Software Association](#)
- [Mass Technology Leadership Council](#)
- [Software & Information Industry Association](#)

Industry Websites

- [Computerworld](#)
- [E-Commerce Times](#)
- [Forrester Research](#)
- [International Data Corporation](#)
- [PC Magazine](#)

Industry Trends

Web-based Development Tools — Programmers are increasingly using web-based collaboration tools to host, share, and revise software code. Demand for these services is growing as more employees work remotely and as open-source software becomes more common. GitHub, the world's largest collaborative code-hosting service, has gained more than 18 million users since its launch in 2008. Such tools help software programmers develop and test applications more quickly.

Open-Source Software — Linux-based operating systems and other open-source software have grown in popularity in the last decade. Such software has source code which is freely available to be modified and redistributed. The growth of open-source software poses a competitive threat to the software industry's traditional license-based business model; some open-source software providers generate the bulk of their revenue from post-sale support rather than product sales.

New Programming Methodologies — Software developers continue to explore new approaches to project management to better serve customers and speed products to market. One such method, agile development, has gained widespread adoption among developers. The agile development process emphasizes customer collaboration, constant adaptation, and iterative development periods that result in regular delivery of working software.

Computer Advancements — Ever-improving computer performance provides software developers with opportunities to move into new markets. Technology related to video streaming, for example, has advanced as processing and networking capabilities have improved. Faster computers also spur upgrades to existing programs, which can be altered to take advantage of improved hardware performance.



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Software and Software as a Service SaaS (Continued)

Education Software — Booming private-sector investment is spurring innovation and competition in the education software market. Tech giants including Facebook, Amazon, and Google have rolled out personalized learning platforms for students, digital lesson plans for teachers, and many other education products and services. Demand should continue to grow as more schools transition to digital textbooks and administrative tools.

Key Growth Opportunities

Software as a Service — Software companies are increasingly delivering products on cloud-based platforms, typically charging subscription fees for access to online applications. Benefits of this model, also known as software as a service (SaaS), include greater collaborative functionality and lower maintenance costs for users. For publishers, SaaS allows for more flexible licensing options, helps combat piracy, and reduces distribution costs. Cloud-based software also brings new programming challenges related to access, performance, and security.

Mobile Devices — The explosive growth of smartphones and other internet-enabled mobile devices provides software developers with new opportunities. With widespread adoption comes the need for new operating systems, wireless connectivity and security applications, messaging programs, and productivity tools. Many existing applications and websites are also being redesigned to properly function and display on mobile devices.

Outsourcing — Because of the high cost of US programmers, some software companies outsource part of their production work to other countries. Developments in communication technology and software that allow multiple users to collaborate have made foreign outsourcing easier. India remains the top outsourcing market, but other Asian nations, as well as countries in Eastern Europe and Latin America, are emerging in the market.

Internet of Things — More and more devices are being connected to the internet, a trend commonly referred to as the "Internet of Things." The wave of new internet-enabled electronics, including fitness trackers, home safety and security systems, and appliances, provides software companies with new development opportunities. Challenges in the burgeoning field include conflicting software standards, as well as privacy and security concerns.

Virtual Reality Applications — Some software developers believe virtual reality (VR) applications will provide the next great wave of industry growth. Devices such as VR headsets, which allow users to experience computer-simulated environments, are beginning to enter the consumer market, driving demand for games and other applications that use VR content.



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Software and Software as a Service SaaS (Continued)

Automotive Software — Advancements in automotive technology are increasing the global auto industry's reliance on software applications that make vehicles safer and more connected. On-board computers built into many new vehicles control core driving systems such as steering, braking, and acceleration. The software used to operate those systems and other features like dashboard apps, automated parking assistance, and heads-up displays, may contain more than 100 million lines of code. Security is a top priority for automotive software developers as carmakers face increasing pressure from regulators and consumers to protect vehicles from cyber-attacks.

Critical Resources

Project Managers: Lead and guide the work of technical staff. Serve as liaison between business and technical aspects of projects. Plan project stages and assess business implications for each stage. Monitor progress to assure deadlines, standards, and cost targets are met.

Technology Analysts: Analyze business data processing problems to implement and improve information systems. Analyze user requirements, procedures, and problems to automate or improve existing systems and review computer system capabilities, workflow, and scheduling limitations.

Data Analysts: Design and validate databases including designing or testing logic checks. Develop project-specific data management plans that address areas such as data coding, reporting, or transfer, database locks, and work flow processes. Process data, including receipt, entry, and verification of information. Generate data queries based on validation checks or errors and omissions identified during data entry to resolve identified problems.

Security Analysts: Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure.

Call Preparation Questions

What plans does the company have to expand its development work into new areas?

Companies often specialize in one area, but lack of diversity can be dangerous if demand shifts.

What programs or strategies does the company employ to help it retain key employees?

Companies often depend highly on a few employees with key knowledge.

How does the company track new software trends?

Some companies have a market intelligence staff that maintains close contact with many industry participants.



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Financial Transaction Processing

Companies in this industry provide services such as credit card processing, electronic funds transfer, and check clearing. Major US companies include Alliance Data Systems, First Data, Global Payments, Heartland Payment Systems, MasterCard, Visa, and Western Union.

Customers who pay for processing services are financial institutions and retailers that issue their own credit and debit cards and the merchants that accept the cards as payment.

Revenue is seasonal, because transaction volume increases in the fourth quarter holiday shopping season, the back-to-school buying period, and significant holidays.

Top 20 US Companies in This Market Likely to Need MSIS Talent

1. Visa, Inc., Foster City, CA
2. First Data, New York, NY
3. PayPal Holdings, San Jose, CA
4. Master Card, Purchase, NY
5. FISERV, Brookfield, WI
6. Western Union, Englewood, CO
7. Total System Services, Columbus, GA
8. Barclays Financial, Wilmington, DE
9. Global Payments, Atlanta, GA
10. Heartland Payment Systems, Atlanta, GA
11. Euronet Worldwide, Leawood, KS
12. Moneygram International, Dallas, TX
13. Fia Card Services, Wilmington, DE
14. Cardtronics, Houston, TX
15. Blackhawk Network, Pleasanton, CA
16. WEX, Inc. Portland, ME
17. Dolex Dollar Express, Arlington, TX
18. Cardworks, Woodbury, NY
19. Green Dot Corporation, Pasadena, CA
20. IPAYMENT, Inc., Westlake Village, CA

Industry Resources

Professional Associations / Events

- [American Transaction Processors Coalition](#)
- [Electronic Transactions Association](#)
- [National Merchants Association](#)
- [Electronic Payments Association](#)
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Industry Websites

- [Elavon](#)
- [Entrepreneur](#)
- [First Data Corporation](#)
- [MasterCard](#)
- [Payments Source](#)
- [PaymentsNews](#)
- [Pymnts.com](#)
- [The Nilson Report](#)
- [Total System Services](#)
- [Visa](#)



ROBERT H. SMITH SCHOOL OF BUSINESS

Financial Transaction Processing (Continued)

Industry Trends

Growth of Third-Party Processors — The payment processing market in both the US and Canada has been shifting from traditional financial institutions to independent third-party processors, such as First Data, Total System Services, and NOVA Information Systems. Third-party processors have developed more efficient information creation, processing, handling, storage, and retrieval systems.

E-Commerce and Mobile Payments Expand — Emerging technologies such as near-field-communication-enabled smartphones that include mobile wallet software are creating new opportunities for payments processors. Companies are increasing their market penetration and leveraging infrastructure in order to grow their e-commerce and mobile payments businesses.

Key Growth Opportunities

Mobile Point of Sale mPOS — The most in-demand technology for brick-and-mortar retailers is mobile payment capabilities, according to Chain Store Age. Self-checkout and scan-as-you-shop are key capabilities for software development. The obvious benefits of mPOS technology (and there are many) include improving the customer experience by speeding the checkout process and avoiding instances where customers abandon a purchase when faced with long checkout lines. Barriers to widespread adoption of mPOS by retailers include cost, security concerns, and the effort required to manage remote systems.

Biometrics Speed Identify Verification — In an effort to speed up online shopping and improve security, MasterCard is launching a new payment technology application that relies on fingerprints or facial recognition to verify a cardholder's identity. The card issuer in October 2016 rolled out Identity Check Mobile (ICM) for online shopping in a dozen markets in Europe, including the UK and Germany. MasterCard plans to implement the technology worldwide in 2017. Biometrics speed the digital checkout process by enabling cardholders to verify their identity using the fingerprint scanner on their smartphone or by taking a "selfie" without leaving a retailer's site or mobile app. Other verification methods, which often require remembering a password, can be time-consuming and result in shoppers abandoning the purchase process.

Data Analytics — Processors gather lots of cardholder information and pass it to marketing specialist firms for analysis and data mining. By analyzing the information gathered, processors can help clients understand consumer spending patterns. Financial institutions have many relationships with customers, but processors often are best-positioned to piece together a complete picture of those relationships.



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Financial Transaction Processing (Continued)

Critical Resources

mPOS Implementation Specialists - To meet increasing demand for mobile payment capabilities from retail stores, financial transaction processors will want to facilitate the adoption of mPOS systems and the secure processing of mobile payments.

Mobile App Biometric Function Specialists - To enable mobile phone-enabled biometric security systems, transaction processors will need to develop expertise to utilize smartphone cameras and scanners.

Near-field Mobile App Developers - SmartWallet applications will likely be a high growth area within the transaction processing industry.

Data Analysts - Opportunities exist to create new marketing data products from analysis of transaction processing data.

Call Preparation Questions

What investments in data security is the company planning?

With sensitive financial and personal information at stake, security breaches and fraud, including identity theft, are top issues for credit card processors.

How could the company help clients better understand customer spending habits?

Processors gather lots of cardholder information and pass it to marketing specialist firms for analysis and data mining.

How does the company plan to grow?

Emerging markets such as prepaid cards and wireless terminals offer growth potential.

How does the company plan to differentiate itself from the competition?

Technological innovation makes processing faster and cheaper.