TDWI RESEARCH

TDWI BEST PRACTICES REPORT

Visual Analytics for Making Smarter Decisions Faster

Applying Self-Service Business Intelligence Technologies to Data-Driven Objectives

By David Stodder

Speaker

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Agenda

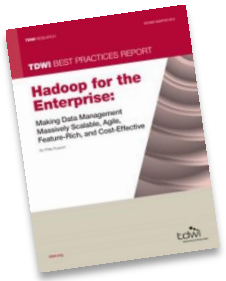
- Preliminaries: About this report
- Defining visual analytics and why it is important
- “Doing BI”: Current satisfaction with tools and evolution toward visual analytics and business-focused analytical applications
- User stories: Progress made to address real-world challenges
- Research results: Gaining insight from peer experiences and practices
- Closing recommendations and Q&A

About the TDWI Best Practices Reports Series

- Educate technical and business professionals about new technologies, concepts, and best practices for addressing a significant problem or issue
- Survey of business/IT pros with focus on data architecture, data integration, analytics, business intelligence, big data, and more
- Research: includes interviews with user organizations and technology experts; sidebar case studies
- The result: 30-page report, Webinar, presentations, infographics, blogs, social media

Recent Best Practices Report Topics

- Hadoop for the Enterprise
- Next-Generation Analytics and Platforms
- Real-Time Data, BI, and Analytics
- Business-Driven BI and Analytics
- Evolving Data Architectures in the Age of Big Data



Why a Report on Visual Analytics for Making Smarter Decisions Faster?

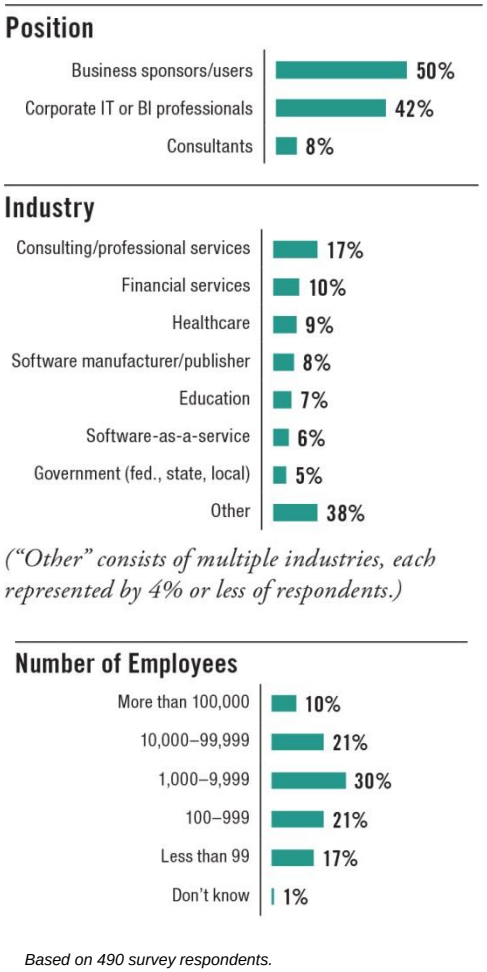
Report Motivation: Driving Change in BI Status Quo

- Many users would like to move beyond spreadsheets and limited BI to embrace visual, self-directed BI and analytics; they want to be better able to explain and share data-driven conclusions
- Technologies and methods are maturing to support self-service visual analytics and business-focused analytical applications, including preparation of data for their use
- Technology could enable more “intelligent” processes and operations

Report Objectives

- Examine experiences with visual analytics and business-focused analytical applications
- Learn from research to recommend best practices for improving use

Research Methodology and Demographics



Survey Methodology

- March/April 2015: Invitations sent via e-mail to TDWI professional community (business/IT executives, VPs & directors of BI, analytics, and DW, business/data analysts, LOB and departmental directors and managers, other IT and BI/DW professionals)
- 490 total responses; 322 fully completed survey responses

Survey Demographics

- Largest percentage was business executives and sponsors/users; includes business/data analysts (50%)
- Data and IT professionals (42%); Independent consultants (8%)
- *Industries:* Consulting/prof. services (17%); financial services (10%); healthcare (9%), software manufacturer/publisher (7%), education (7%), software-as-a-service (6%), government (5%); 47% U.S. respondents; 22% Europe, 8% Canada, 23% other regions
- 31% with > 10,000 employees; 30% from those with 1,000 – 9,999 employees; 38% from orgs with < 999 (1% don't know)

Other Research Methods

- Interviews with business and IT executives and managers, BI and analytics experts in the industry

Breaking Open the Potential of Data

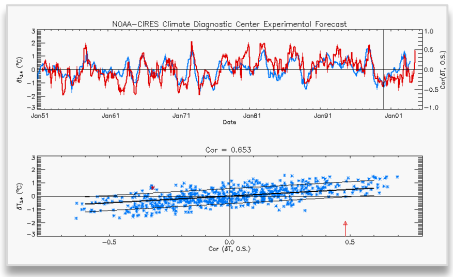
- **Data-Driven:** Doing better at decision-making than disorganized, uninformed guessing
- **Ease of use**: Demand rising for easier means of working with data and sharing insights
  - *Less IT involvement*
  - *Cloud and SaaS as alternatives to long, on-premises deployment cycles*
- **Personalized BI**: Older “one-size-fits-all” BI evolving into flexible, self-service visual analytics

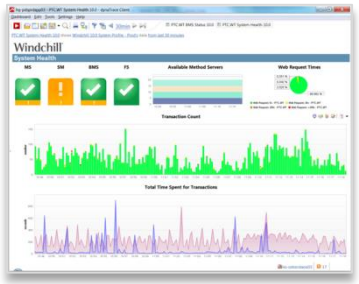
“Visual Analytics”: Fortuitous Technology Combination

- **Analytic data interaction**: Technologies enable users to go beyond limited, static reports
  - *Easier than OLAP for getting to deeper levels in data for exploration, root cause analysis, and more*
  - *Pure data discovery*
- **Data visualization**: Aiming for immersive, creative, and “beautiful” experiences with data and analytics
- **Platform evolution** to support visual analytics
  - *In-memory computing*
  - *Distributed, scalable data architectures*
- **Application and process integration**:
  - *Front end for operational intelligence, performance management, and continuous improvement*
  - *Identifying decisions to automate; monitoring results*

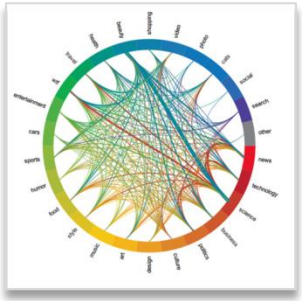
Immersive and Beautiful: The Visual Analytics Experience

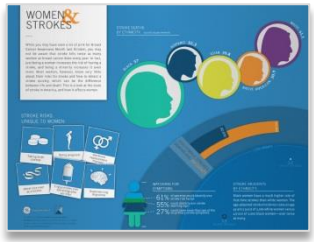
- "Graphics reveal data. Indeed graphics can be more precise and revealing than conventional statistical computations." – *Edward Tufte*





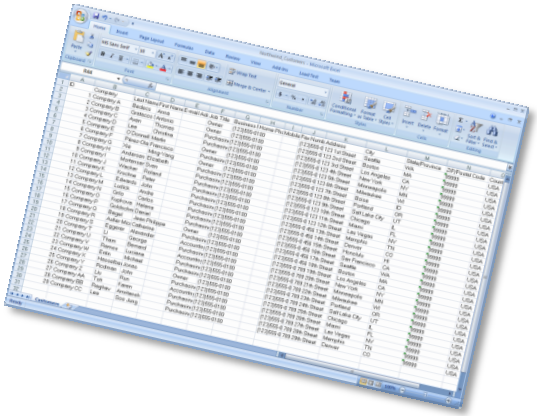
- "When done beautifully, successful visualizations are deceptive in their simplicity, offering the viewer insight and new understanding at a glance." – *J. Steele and N. Iliinsky*

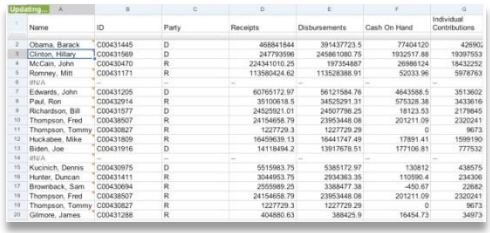




Spreadsheets: Still a Common Tool for "Doing BI"

- **TDWI Research**: Majority of those surveyed work with a BI tool (61% very often and 24% somewhat often), but just slightly fewer use spreadsheet applications (54% very often and 26% somewhat often
- **Challenges**: Uncontrolled silos, poor data quality and governance, no best practices
- **Spreadsheet integration**: BI and visual analytics must play well with spreadsheets



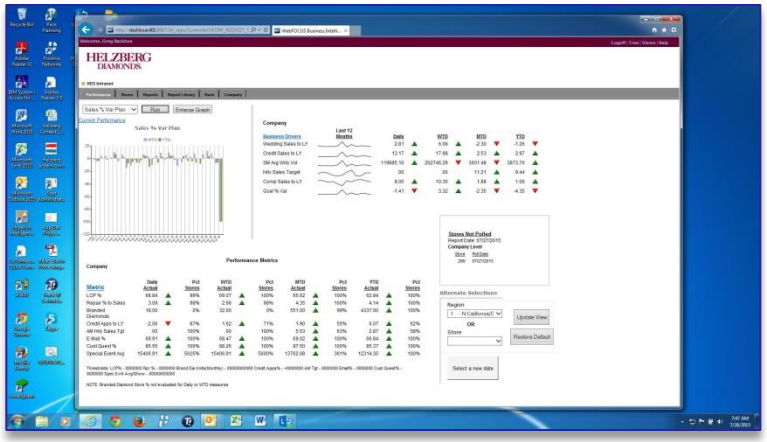


Credit: Scott Gilbertson

Credit: Macworld

User Story: Cleaning Up Chaos, Improving Operations

- **Helzberg Diamonds**: Retailer sought to improve flow of quality, easily consumed data
- Using WebFOCUS for interactive dashboards – not scorecards "that everyone is just sitting around watching"



HELZBERG DIAMONDS
I AM LOVED
A Berkshire Hathaway Company

"We have eliminated a lot of spreadsheets, but at the same time, we have embraced [Microsoft] Excel as an output…users' spreadsheets are sourcing consistent, current data."
– Greg Backhus, Director of Data Warehousing and BI, Helzberg Diamonds

User Story: Increasing Decision Speed and Quality

- **Integrating Analytics & GIS**: Moving beyond using slow spreadsheets for analyzing voluminous GIS attribute data
- Geologists able to analyze single wells or broader collections of wells; filtering to see water injection rates, well productivity, and more
- Using TIBCO Spotfire to see all the dimensionalities of the data in GIS maps

"It used to take longer to make decisions and people weren't as confident in them if they couldn't answer all the questions they had. Now, people can get answers to instantly by filtering the data appropriately." – *Mark Ruths, Consultant Geophysicist and Technology Coordinator, Major Integrated Energy Firm*

Current Satisfaction with BI Tools and Functionality

Satisfaction is highest with established, mature activities such as predefined query and reporting. It is less for visual analysis, OLAP, and performance management.

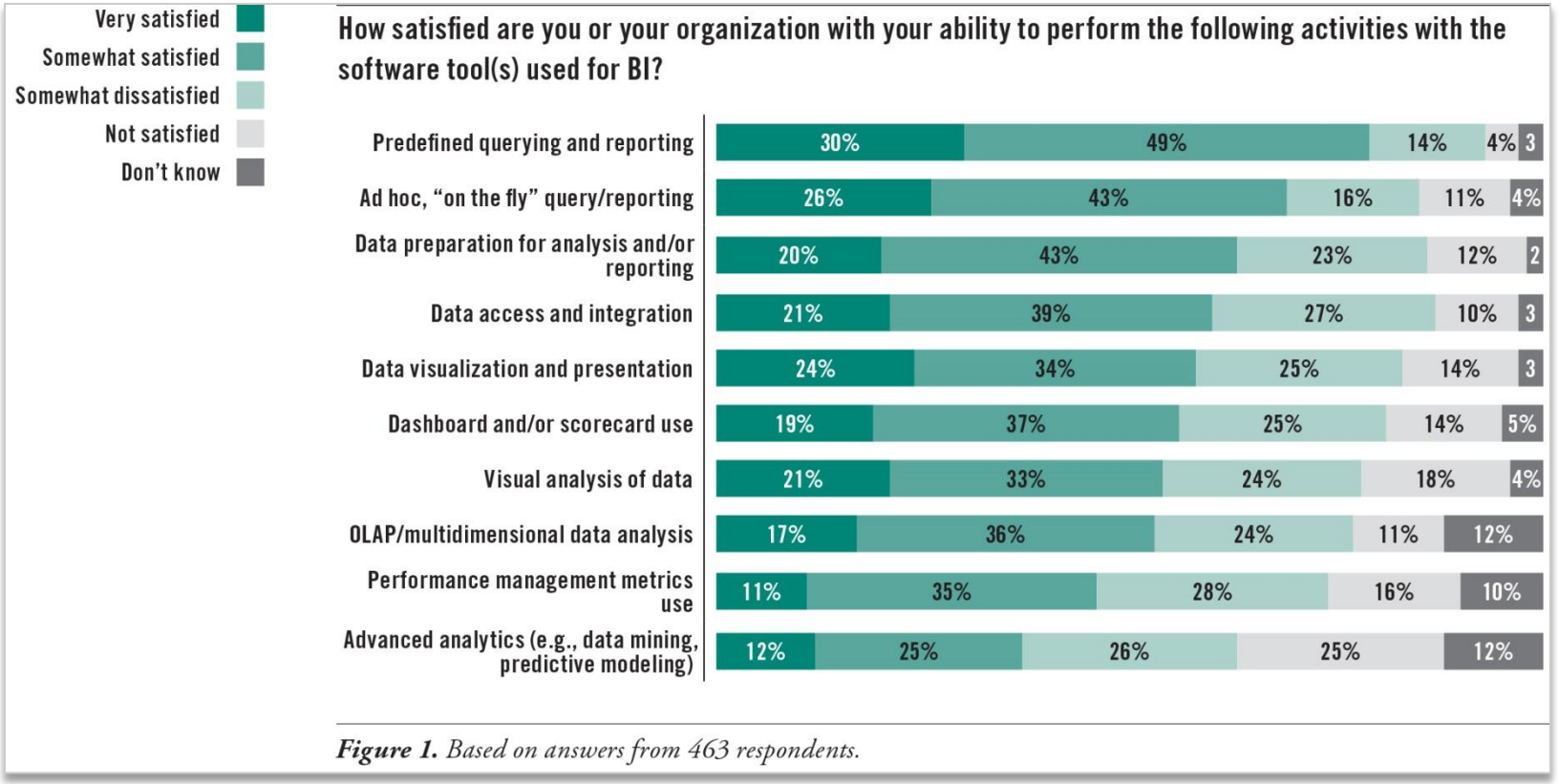


Figure 1. *Based on answers from 463 respondents.*

Faster Deployment with Cloud and SaaS: Picking Up?

Cloud and software-as-a-service options are maturing, giving organizations more options for servicing rising demand for BI and visual analytics. However, concerns still hold back wider deployment. Not surprisingly, on-premises deployment still dominates. "Business-driven" SaaS deployment is slightly higher.

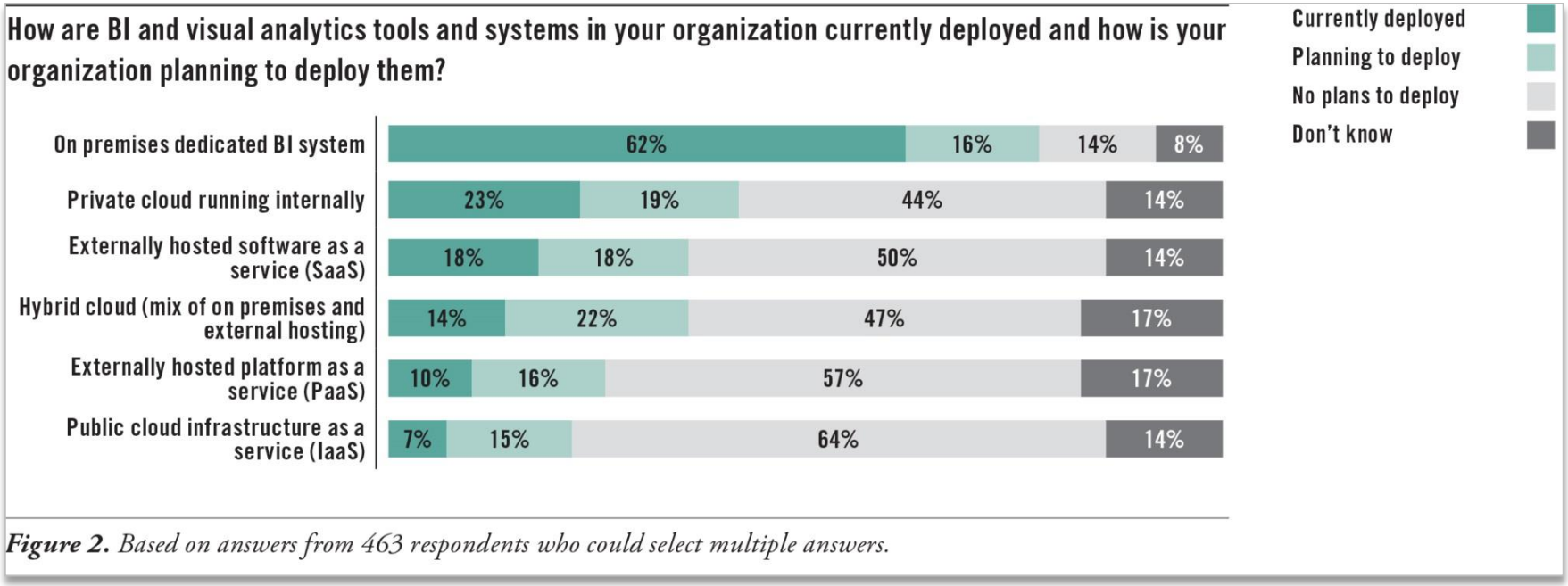


Figure 2. *Based on answers from 463 respondents who could select multiple answers.*

Joint Tool/Application Selection Favored for BI Activities

Even as the "business-driven" trend grows, respondents indicate that joint business/IT tool and application selection predominates.

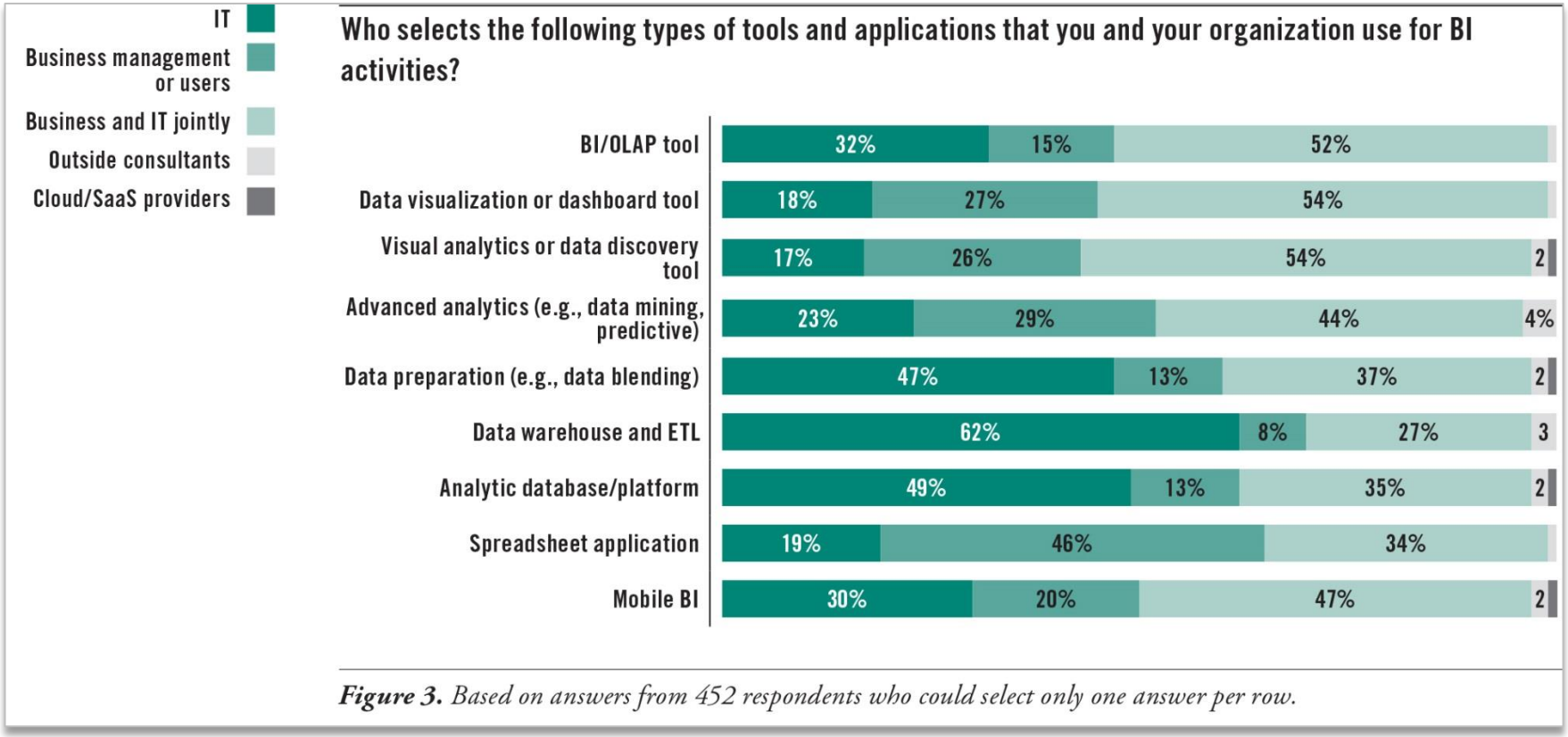


Figure 3. *Based on answers from 452 respondents who could select only one answer per row.*

User Story: Driving Innovation with Better Data

- **Watts Water**: Business growth created management complexity: 100,000 SKUs distributed by 45 agents
- Users had to wait for IT to find system time to run reports; requirements would change and they'd have to run them again
- Addressed IT concerns about Tableau usage by keeping IT in control of the data and demonstrating good practices

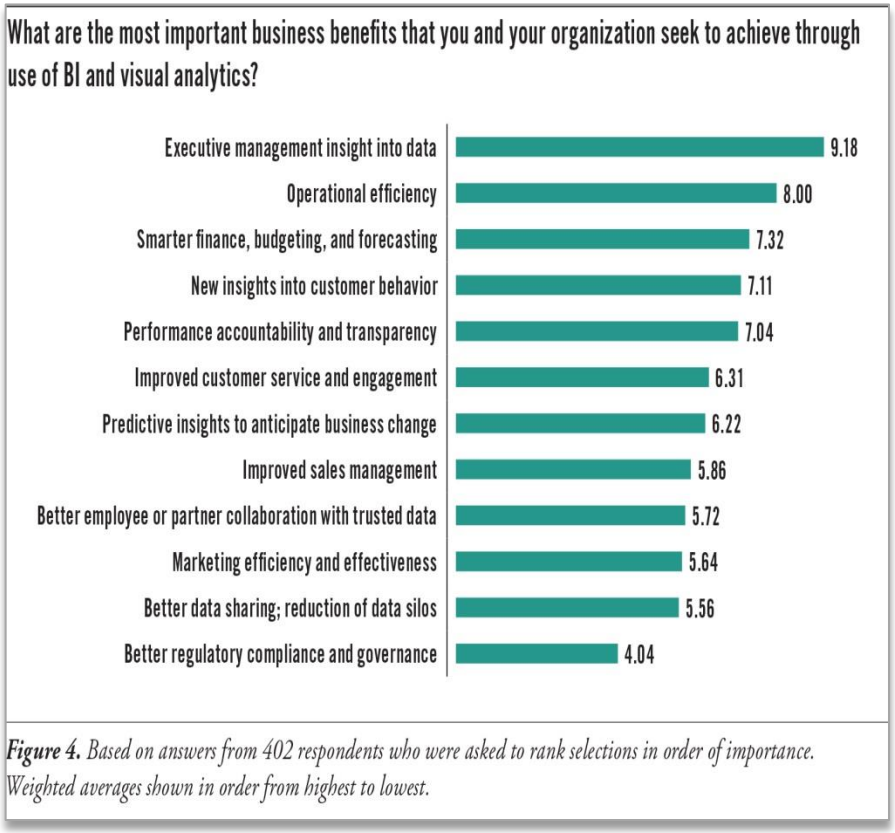
"Once users have something useful for the entire audience, we look it over and make sure everything is done right. We then put it in the production folder where everyone can start using it."
– *Kris Munson, Director of Pricing, Watts Water Technologies*

BI and Visual Analytics on Mobile: Some Growth

- Consumer surveys show amount of time spent on mobile now surpassing time spent on PCs
- TDWI Research: In the majority of organizations surveyed (42%), one quarter or fewer of users are performing some or all of their work on mobile platforms
- About half (51%) of respondents expect their users will spend more time on mobile in the next year
- Interview research: Takes time for organizations to be assured of security and governance

Driving Visual Analytics Expansion: Business Benefits

- Improving executives' insight tops the list
  - *Not all executives do deep analytics, but improving ability to customize data views and perform easier analysis is important to data-driven leadership*
- Operational efficiency an important benefit sought
  - *Demand for easier, self-service visualization and analysis at the operational and LOB level*
- Performance management #5



User Story: Actionable Info Keeps All In the Know

- **Mueller**: Manufacturer and reseller of pre-engineered metal buildings and metal roofing products
- Needed to turn KPIs into actionable information; enable users to drill down, see data from different perspectives
- Using IBM Business Analytics to automate integration, curation, and visualization
  - *Giving users relevant info, not 3k transactions to sift through*

"Self-service tools allow us to take different pieces of data from different sources that we're trying to analyze and put them together without being confined to defined elements and just one particular data model."
– Mark Lack, Mgr. of Strategy Analytics and BI, Mueller, Inc.

Diverse Growth Paths for BI and Visual Analytics

How new technologies enter an organization can determine who ultimately uses them, to which parts of the organization they spread, and whether they present IT with management challenges in terms of data quality, integration, security, and governance.

- **"IT manages expansion of our enterprise BI platform"**
  - *Mode of expansion experienced by most research respondents (34% said very accurate, 43% said somewhat accurate)*
  - *IT managing expansion on "case-by-case basis" second most prevalent*
- **"Business users select and deploy tools on their own"**
  - *44% said this accurately reflects the way BI and visual analytics expand (52% it was not accurate)*
  - *"Land and expand": 56% experience expansion this way*
- **"Users select tools to explore data and build prototypes; IT or consulting developers then build production applications"**
  - *Can be a popular way to give users data discovery and experimentation freedom; 53% said it reflects their approach, although just 10% said "very accurately"*
  - *Just 23% said selecting cloud-based or externally hosted tools first is how they expand*
- **"Developers work with open source to build BI/visual analytics"**
  - *12% said very accurate, 32% somewhat*

User Experiences with Visual Analytics Capabilities

- *Most success is with dashboards or scorecards*
- *Filtering data and editing existing views and charts next*

- *Users struggle with advanced capabilities*
- *Visualization to develop queries key to "immersive" user experience*

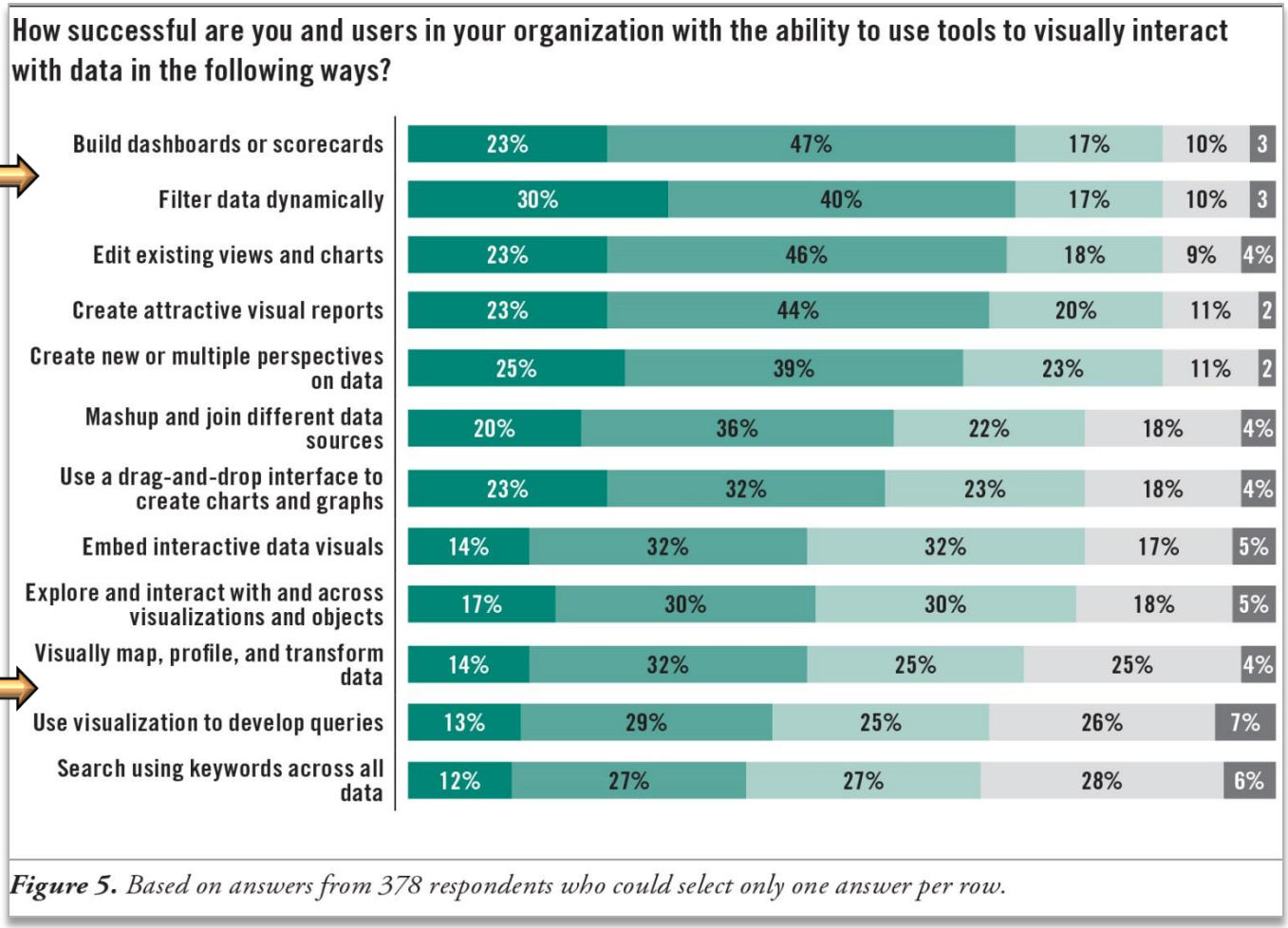


Figure 5. *Based on answers from 378 respondents who could select only one answer per row.*

Success in Visual Interaction with Diverse Data Sources

- *Traditional sources most prevalent; importance of spreadsheet integration*
- *OLAP cubes #5*

- *Less experience evident with Hadoop, NoSQL, other nontraditional sources*

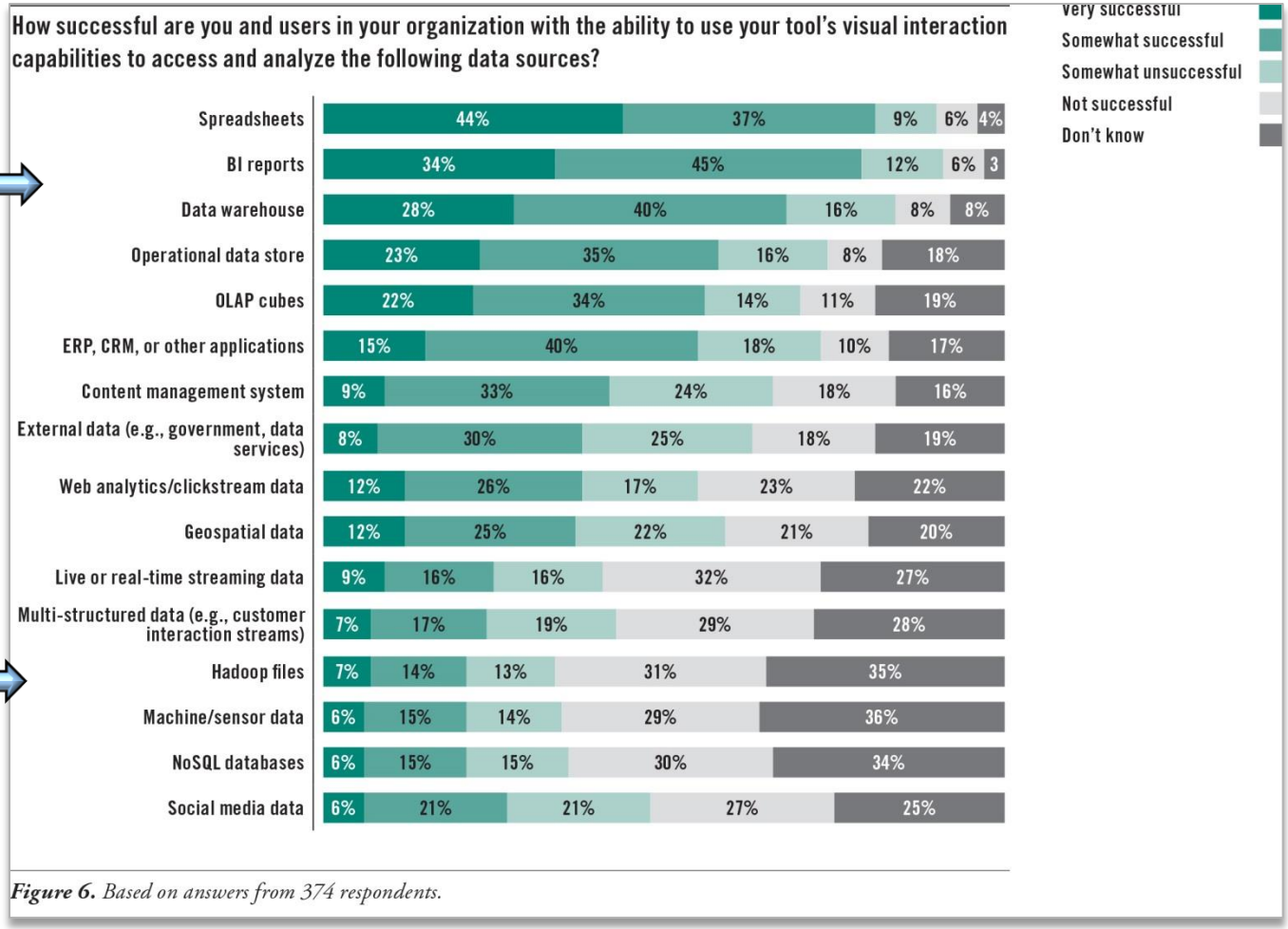


Figure 6. Based on answers from 374 respondents.

User Story: Diverse Data for KPI Collaboration

- **Swisscom**: Responsible for company's real estate management, users needed to analyze a mixture of internal and external data from partners and suppliers
- Users needed to establish KPIs and wanted an easier way to interact with data and keep everyone informed about KPI status
- Visual data discovery with SAP BW and Lumira

"[Users] want to find out where we have high costs. They also need to compare the monthly vacancy rate…to see how they can increase the share of buildings they can rent out." – *Matthias Mohler, BI Consultant at Swisscom*

Using In-Memory to Free Up Visual Analytics

- **Reduced pre-processing:** Less need to build cubes, aggregations, and other designs for I/O constraints
- **Random access to data**: getting beyond limits of highly structured inquiry
- **Super low latency:** Enabling real time & stream analysis
- **Volume and scale:** Exploit potential of massively parallel, in-memory platforms

Research: Multiple Purposes for Deploying In-Memory

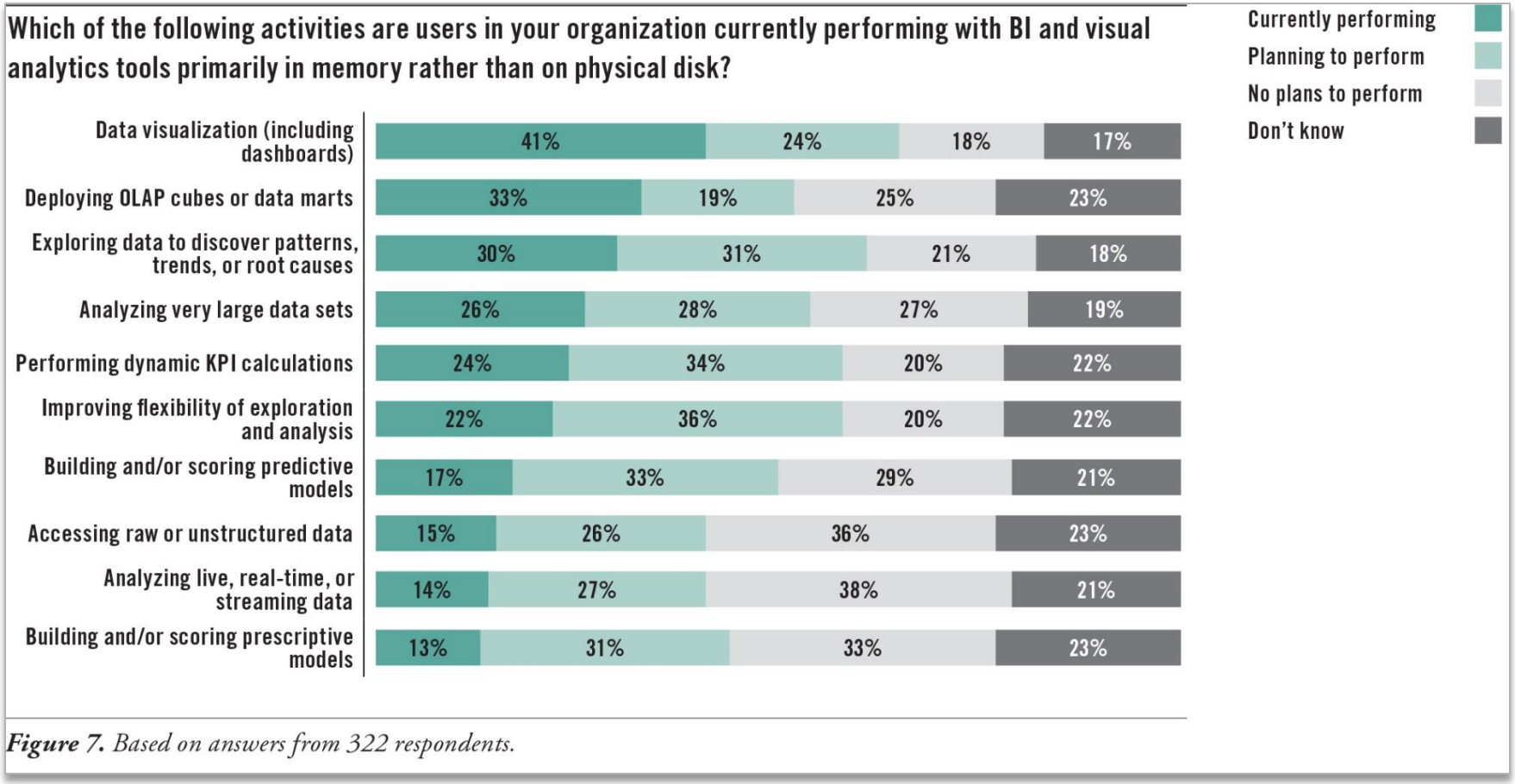


Figure 7. Based on answers from 322 respondents.

User Story: Analyzing Massive Data Volumes at Speed

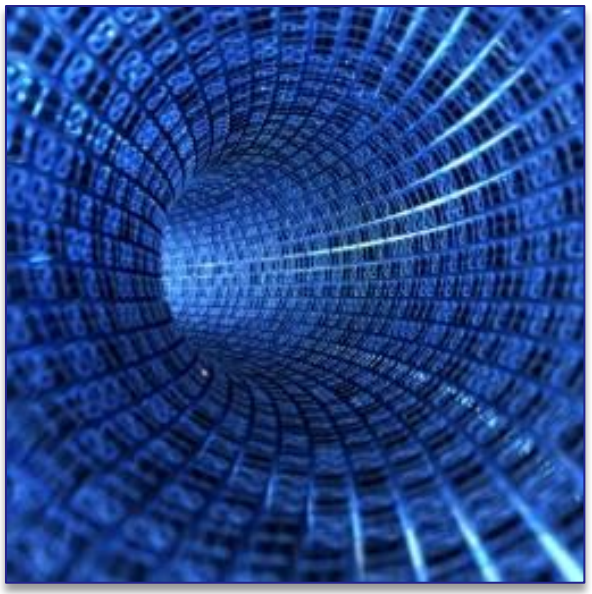
- **UHC**: Health benefits provider serving more than 45 million people; operating division of UnitedHealth Group
- Massive volumes of structured and unstructured data with potential for analytic exploration and research; broadened architecture to include Hadoop and NoSQL
- Enabling analytics in memory with SAS Visual Analytics and LASR

UNITEDHEALTH GROUP®

"We need to avoid I/O and use the power of in memory to iterate really fast through this data. Speed equates to time, and time is money."
– Ravi Shanbhag, Director of Data Science, Solutions & Strategy, UnitedHealth Group Financial Data Management

Data Preparation: Heading Toward Self-Service

- **Self-service data preparation**: data blending, wrangling, munging, etc.
- Modernizing processes for data integration, quality, profiling, and transformation to fit more analytics-oriented requirements
  - *Applying machine learning and other advanced analytics*
- **Data diversity**: Preparing data from Hadoop data lakes and NoSQL sources
- Both inexperienced users and season analysts want to blend data more easily
  - *Ad hoc, on-the-fly, automated*



Data Prep: IT Still Dominates, But Users Progressing

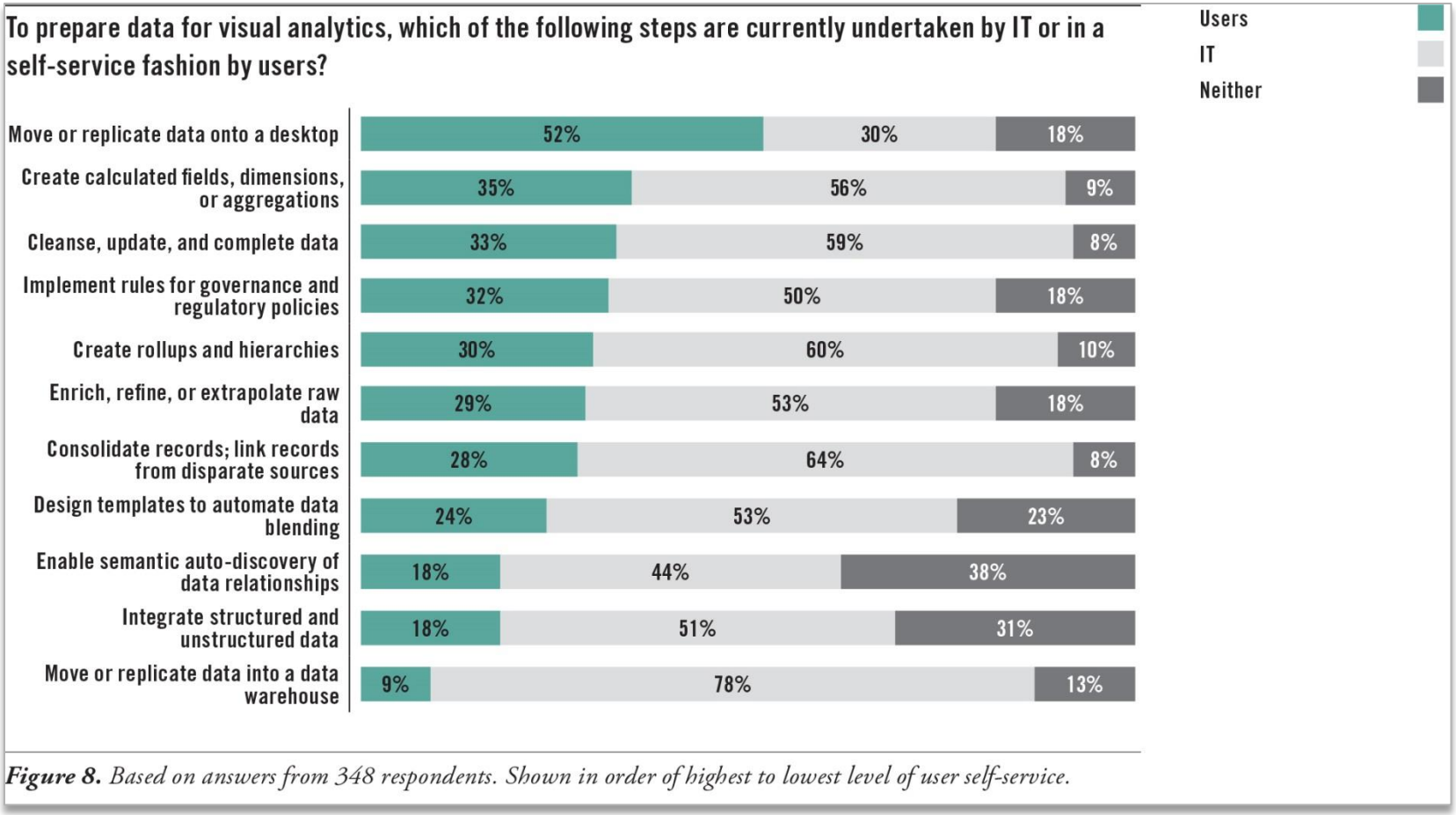


Figure 8. *Based on answers from 348 respondents. Shown in order of highest to lowest level of user self-service.*

Hadoop and NoSQL Data Sources: Barriers Persist

- Majority do not have Hadoop or NoSQL data sources
- Training and expertise are pain points
- Identifying the business case still difficult

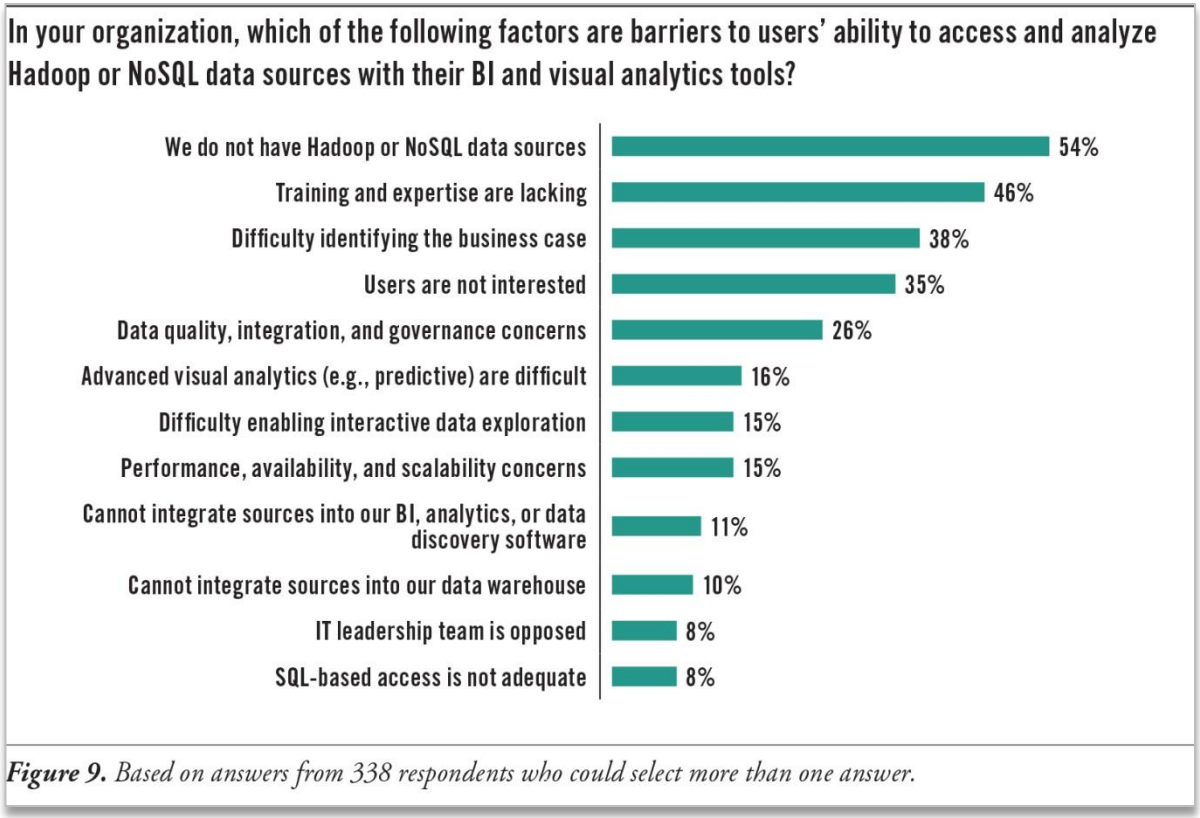


Figure 9. Based on answers from 338 respondents who could select more than one answer.

Visual Analytics Data Interaction and Collaboration

- *Most success is with OLAP-style functionality*
- *Visual analytics helping users identify patterns and trends*
- *Ad hoc made easier*

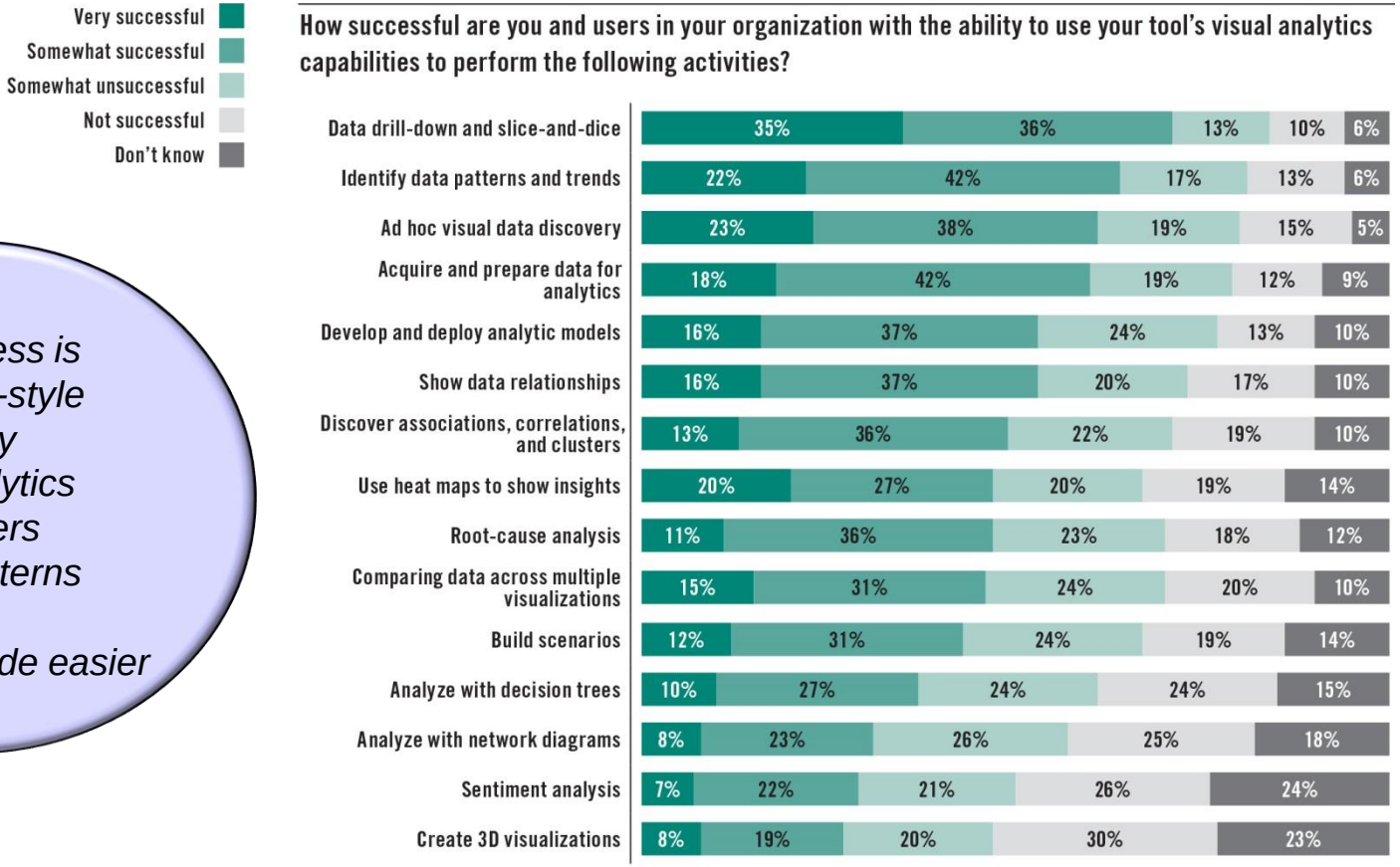


Figure 10. *Based on answers from 368 respondents.*

Improving Presentation and Sharing: Data Storytelling

- Visualizations such as dashboards are critical to better communication about data insights
- Can users explain how data-driven conclusions were reached? Can they suggest actions or decisions to take?
- Research: Firms show interesting in going beyond static reports

User Story: Analytics Fuels Process Improvement

- **NHS Business Services Authority**: provides variety of support services/processes for UK Department of Health and other public sector bodies
- Analytics key to ambitious goals of improving processes and driving better value
- Employing Oracle Exalytics and Endeca to gain insight from vast volumes; applying visualizations to examine trends and anticipate impact

"Start thinking about what changes you want to make that data analytics can help you achieve even before you pen your business case. Do not underestimate the impact that analytics will have on your business." – *Nina Monckton, Head of Information Services, NHS Business Services Authority*

Data Governance and Business/IT Collaboration

As users engage in self-service visual analytics and data discovery, organizations need to establish data governance to oversee what data is being accessed, how it is being accessed, whether data quality is appropriate for users' analytic processes, and more.

- **"Users have role-specific access to data"**
  - *Most research participants agreed with this possible description of their organization's governance*
  - *61% said IT is responsible for data governance for all users*
- **"Data governance covers not just data but what users do"**
  - *59% said this accurately reflects their governance, showing that many are taking a broader strategy*
  - *Documenting policies: Only 11% said this is done; can be critical to avoiding confusion about responsibilities*
- **"Data governance efforts limit flexibility for business users"**
  - *42% of research participants acknowledged the accuracy of this statement for their organizations*
  - *Creating a Center of Excellence or governance committee can help users and IT come to agreement about how tight governance needs to be; nearly two-thirds (64%) indicated that they have some such organization*
- **"Our governance focuses only on data security"**
  - *39% said this is accurate for their organization*

User Story: Lighting Up the "Dark Matter" of Healthcare

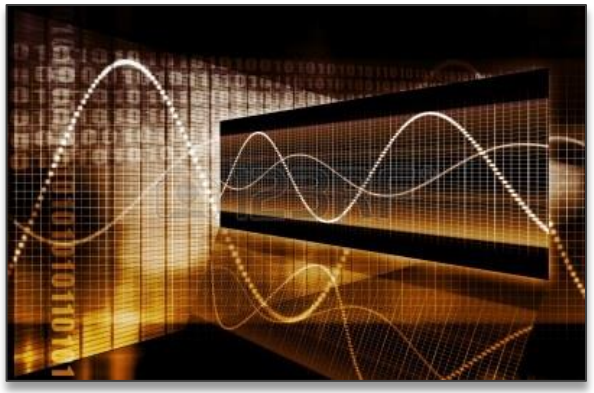
- **Analytics Critical for Healthcare**: Business challenges, regulatory pressures, and changing patient treatment expectations make better and easier analytics a necessity
- DarkMatter²bd provides healthcare market data, visualization tools, custom analytics, and services
- Using QlikView for developing dashboards and visual analytics

DarkMatter²bd

"[Reducing patient recruitment time with analytics] can result in faster approvals, which can mean…savings, longer product market life, and improvements for patients who can get new treatments faster." – *Vince DeChellis, Co-Founder and Principal, DarkMatter²bd*

Visual Analytics and Decision Management

- Organizations seeking opportunities to optimize business processes through smarter and faster decisions
  - *Customer engagement, credit approval, fraud detection, patient treatment decisions, and more*
- "Decision management" about using analytics to improve and optimize processes
  - *Analytics plus rules management, CEP, and more*
- Visual analytics enables managers to more easily identify where optimization and decision automation are possible
  - *Improving interface for monitoring and pattern detection*



Visual Analytics Integration with Applications, Processes

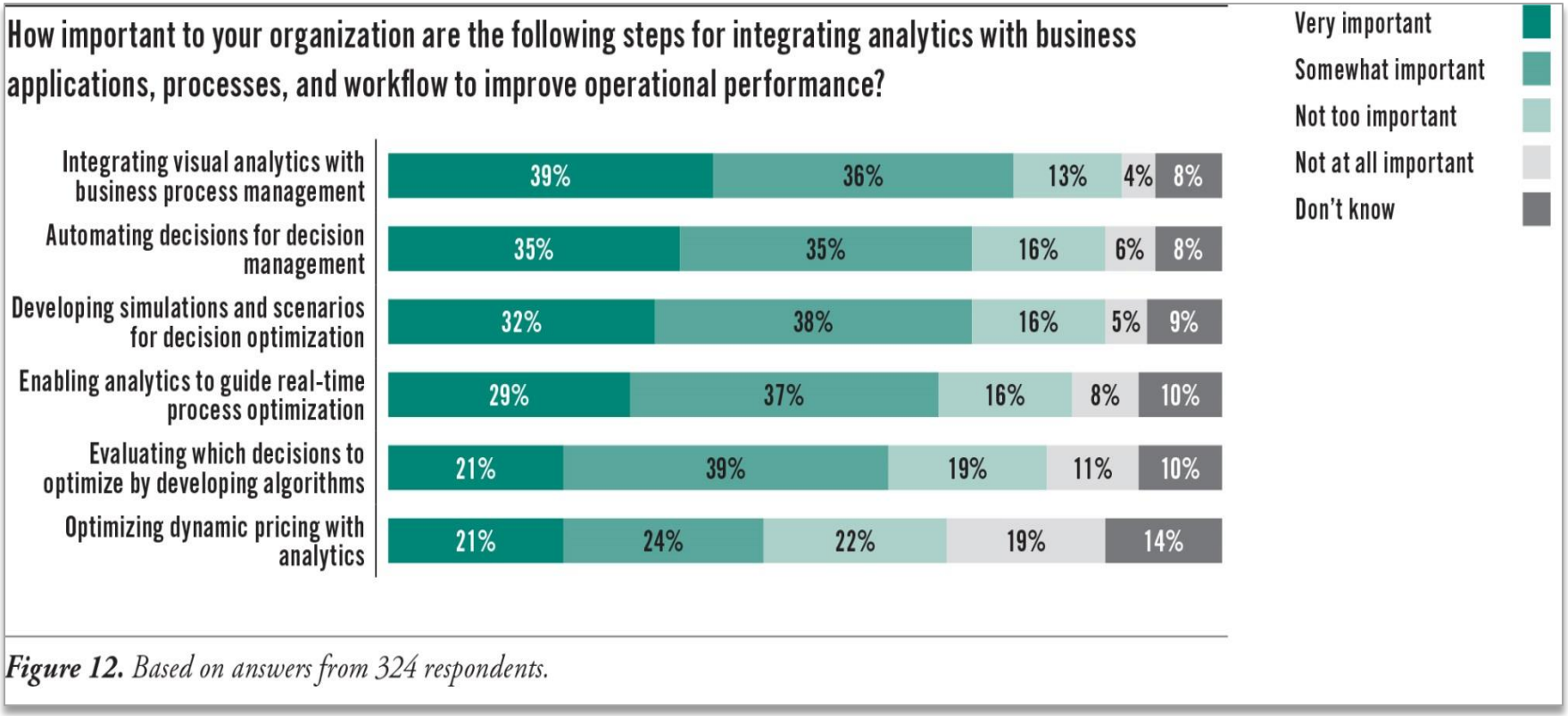


Figure 12. *Based on answers from 324 respondents.*

Closing Recommendations

- **Make self-service visual analytics a priority, but make sure users understand their new responsibilities**
  - *The BI torch has been passed to users, who have much to gain from greater control and freedom; attend to IT concerns*
  - *With freedom comes responsibility; users must accept governance, steps to improve data quality, and more*
- **Aim for "managed" or "governed" self-service with business-focused analytical applications**
  - *Focus on finding the right balance between user freedom and flexibility and proper data security and adherence to privacy and other data regulations*
  - *Establish governance or center of excellence committees to support self-service visual analytics*
- **Provide training and education opportunities for users who seek to do more with visual analytic and business-focused analytical apps**
  - *Help users learn how to do more with analytics, not just building charts and other visualizations*

Closing Recommendations

- **Make self-service data preparation part of the visual analytics experience**
  - *Evaluate technology that supports self-service capabilities for selecting, blending, and otherwise preparing data for visual analytics*
  - *Look for opportunities to use technologies to take pressure off of IT and reduce bottlenecks in the way of user satisfaction*
- **Use visual analytics to support data storytelling for smarter and faster decision making**
  - *Give users greater capabilities for putting together a "story" of how data-driven conclusions were reached and why they are relevant*
  - *Help users move beyond simply presenting reports to tell – and more effectively share – the fuller story of data exploration and analysis*
- **Integrate visual analytics, including as embedded functionality, into strategies for decision management**
  - *To manage high volume of real- or near-real-time decisions, evaluate intelligent automation of decisions ("decision management")*
  - *Integrate or embed visual analytics into point applications*

Thank You!

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Questions & Answers

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