The cognitive advantage

Insights from early adopters on driving business value

Strategic Editorial & Creative, August 2016
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IBM

The Cognitive Era is accelerating

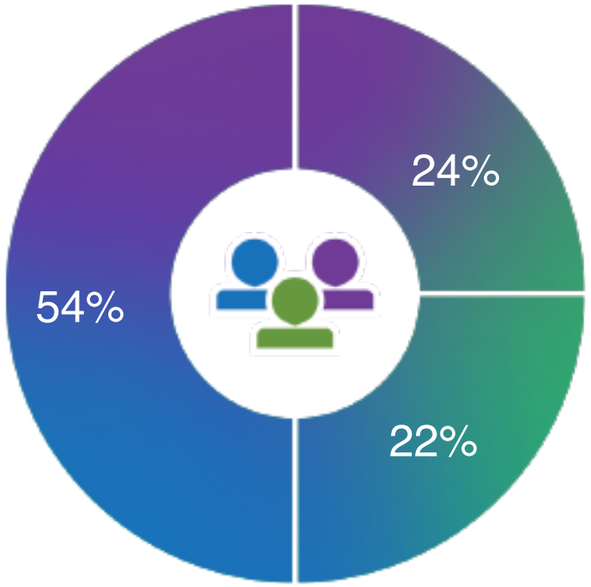
Organizations are infusing digital business with a new level of digital intelligence – creating knowledge from large volumes of data to expand expertise, continually learning and adapting to outthink the needs of the market.

The cognitive computing market is now on an exponential growth curve, expected to grow from $2.5 billion in 2014 to more than $12.5 billion by 2019. Within the next two years, it is expected that half of all consumers will interact with cognitive technology on a regular basis.

To understand how organizations are capitalizing on the potential of cognitive computing and to uncover emerging patterns of adoption, we surveyed more than 600 cognitive decision makers worldwide who already have or are planning cognitive initiatives.

About the study

We garnered insights from more than 600 cognitive decision makers worldwide, cross-industry, from IT to line of business, at various stages of cognitive adoption.



Cognitive Early Adopters

Advanced users | 22% of respondents
Using 2 or more cognitive technology capabilities for more than a year

Beginners | 54% of respondents
Using multiple cognitive technologies for less than a year or using 1 technology for more than a year

Planners | 24% of respondents
Planning to adopt cognitive/AI initiatives within 2 years

In this study, cognitive computing/artificial intelligence (AI) refers to computer-based, intelligent technologies that analyze data and interpret information to generate hypotheses, formulate possible answers to questions, or provide recommendations and predictions. These technologies learn and reason as a result of their interactions.

Organizations are already gaining major competitive advantage from their use of cognitive computing. They're accelerating business outcomes – ranging from improved productivity and efficiency to product and service innovation and market expansion.

Cognitive early adopters see cognitive computing as a key differentiator

65% say adopting cognitive is very important to their **organization's strategy and success**

58% say cognitive computing is **essential to** the **digital transformation** of organizations

62% of users say outcomes from cognitive initiatives **exceed their expectations**

They consider cognitive to be a key ingredient of their strategy to increase competitive advantage

58% of early adopters regard cognitive computing as a “must have” for organizations to remain competitive within the next few years

50% of users say they already gain major competitive advantage from their cognitive initiatives

Patterns of adoption are emerging as organizations kickstart cognitive initiatives

1

Departmental patterns

Department-based use cases where cognitive initiatives are being used or planned

2

Goal-based patterns

Business-need or goal-based use-cases where cognitive initiatives are being used or planned

3

Technology patterns

Technology currently being used or planned in cognitive initiatives

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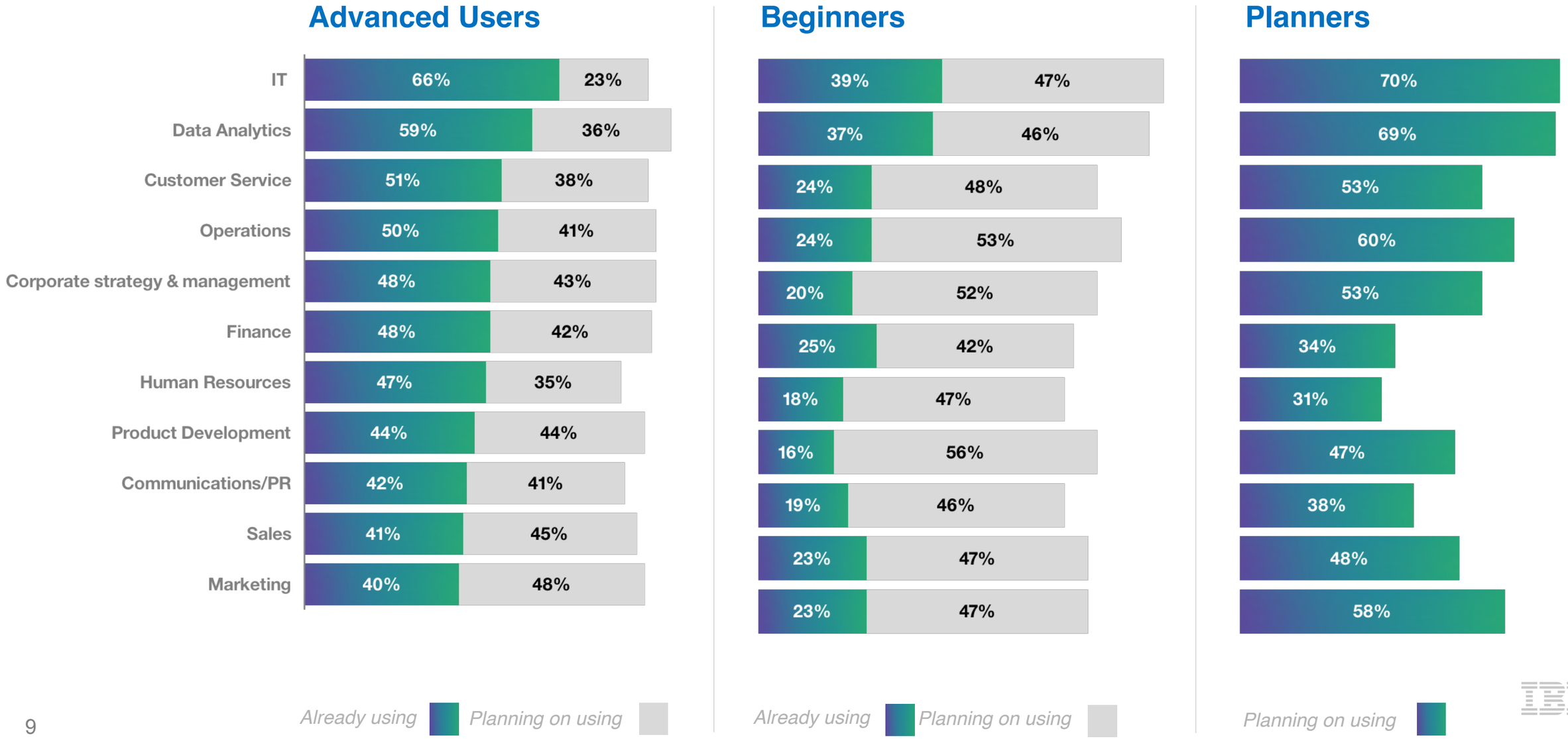
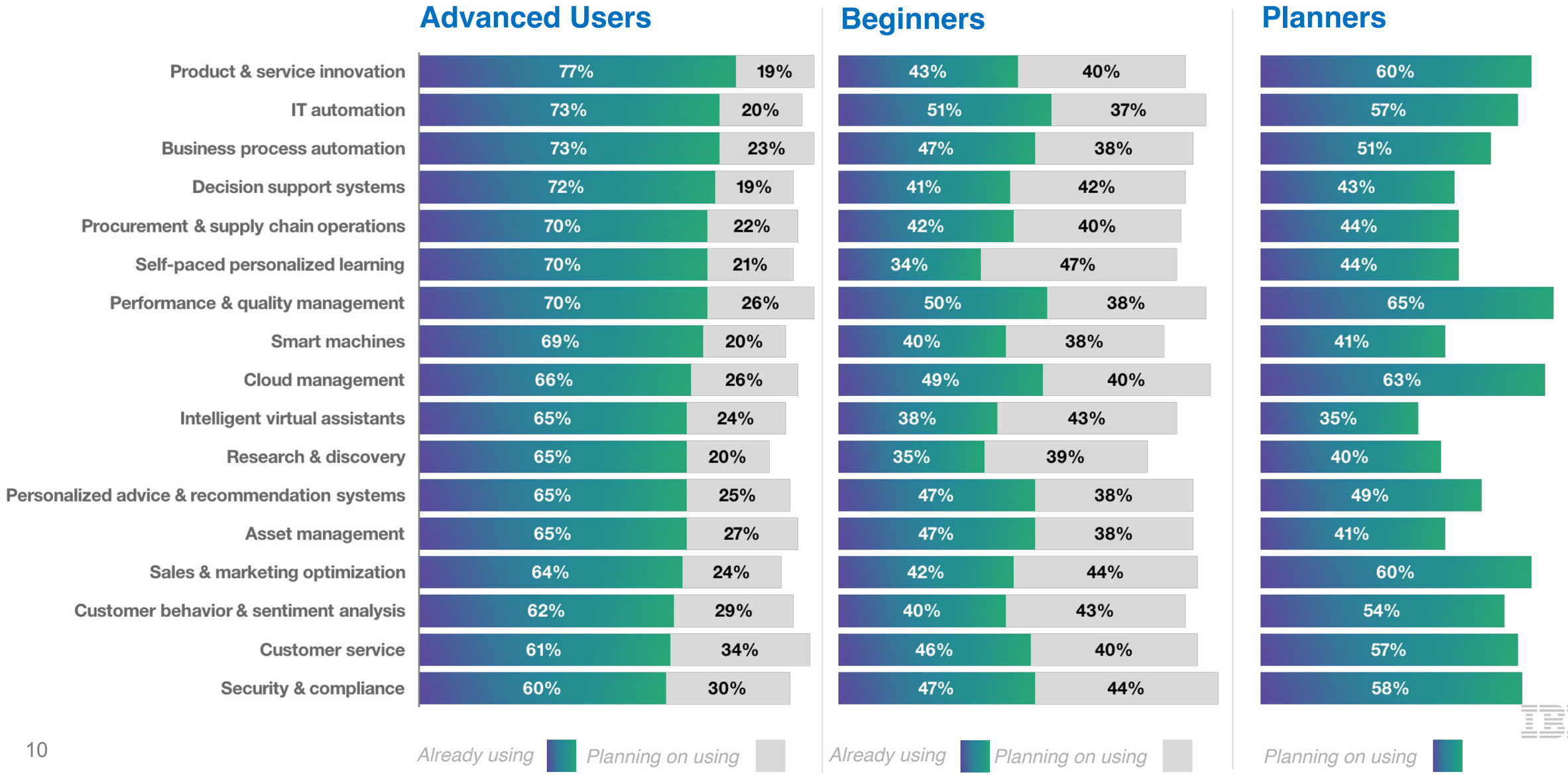
1. Departmental patterns:

IT, Data Analytics and Customer Service are common entry points



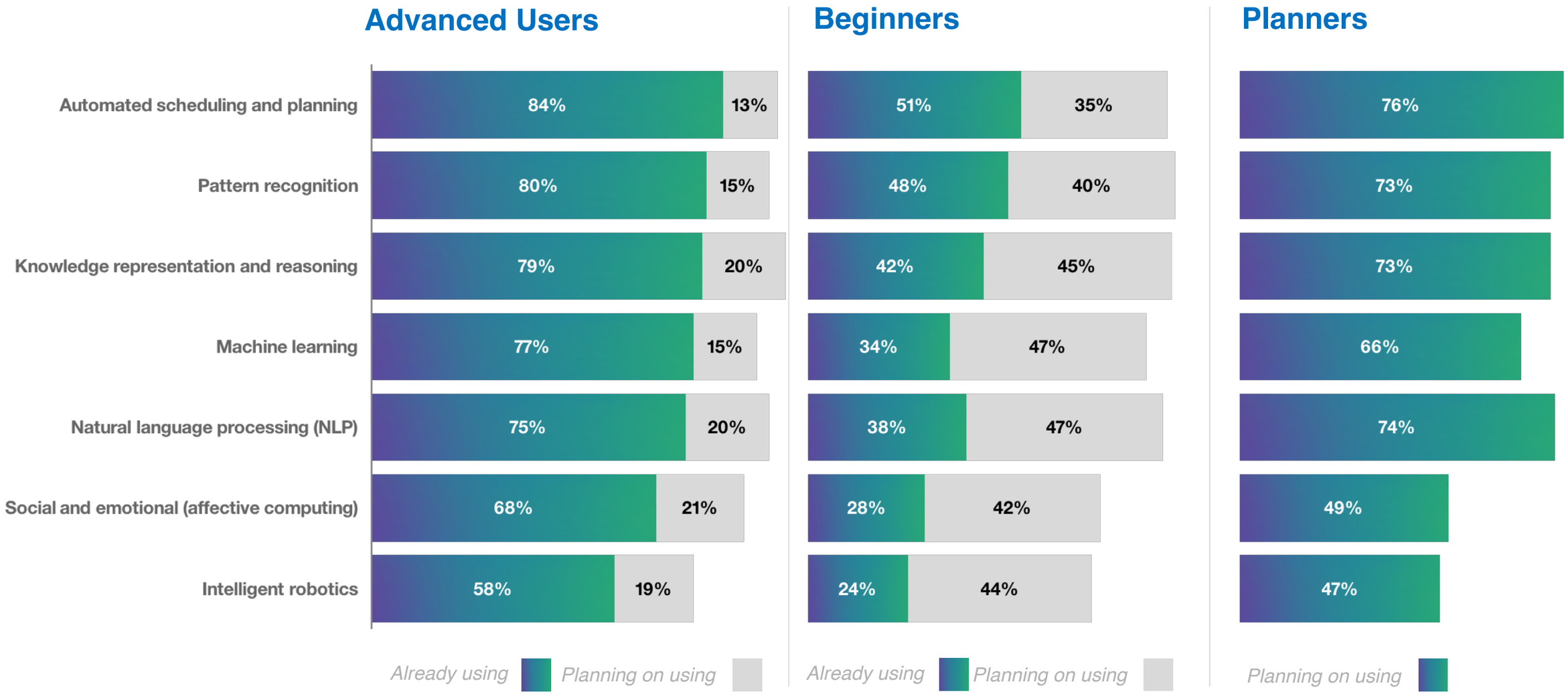
2. Goal-based patterns:

Product & service innovation and IT automation are common use cases



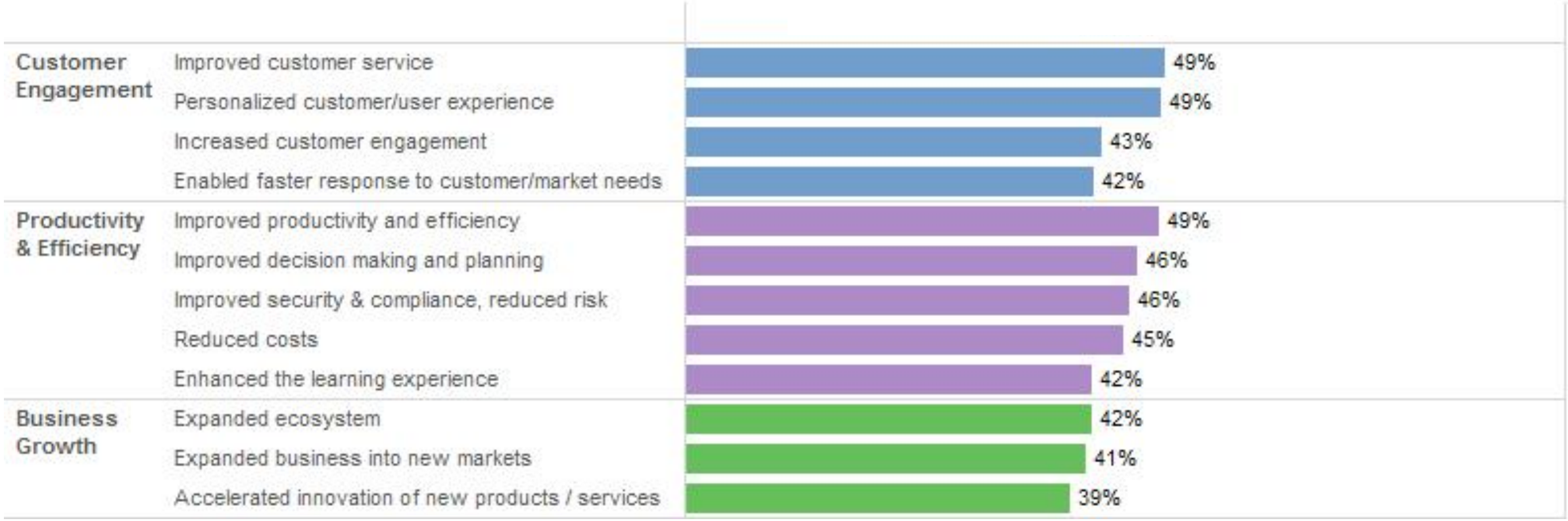
3. Technology patterns:

Automated scheduling and planning and pattern recognition are frequently used



Early adopters achieve a range of outcomes via cognitive–customer engagement, productivity & efficiency, and business growth

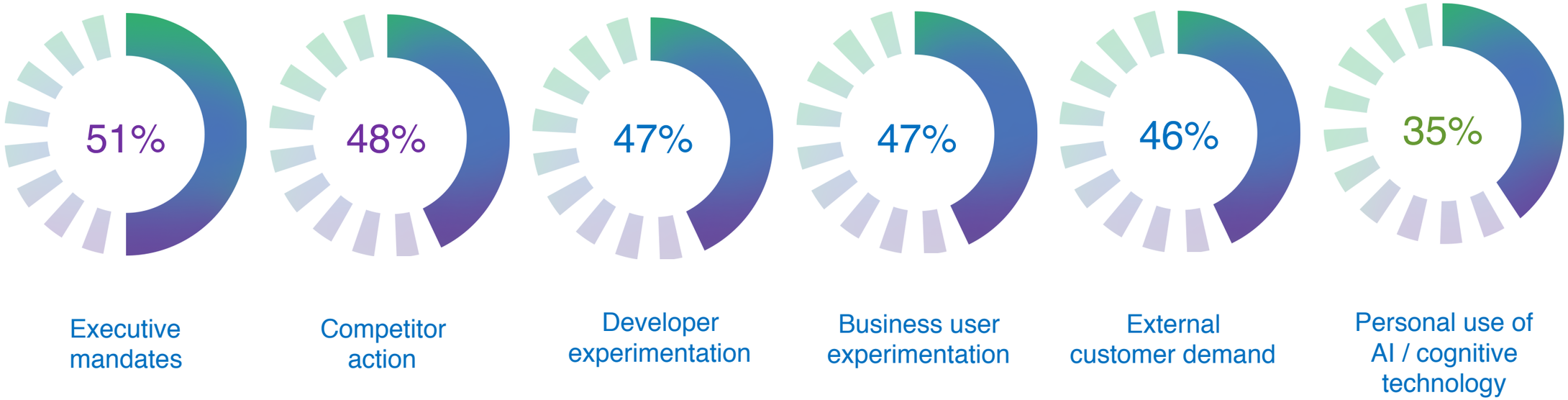
Outcomes achieved with cognitive computing



% achieving outcome

Cognitive efforts are being driven both top-down and bottom-up

Organizational factors driving cognitive adoption



% citing as major driver

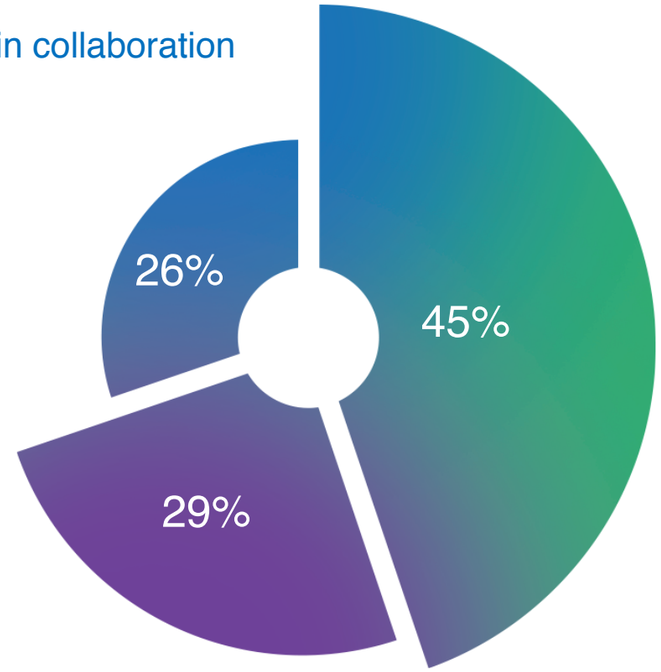
IT and LOB collaborate on cognitive decision making, with technology leaders serving as the primary advocates

IT versus LoB driving cognitive initiatives

45% IT and LOB in collaboration

29% More LOB

26% More IT



Strongest advocates for cognitive initiatives

43% Chief Technology Officer (CTO)

43% Chief Information Officer (CIO)

43% IT Management below C-level

27% Chief Data Officer (CDO)

25% Line of Business Management below C-level

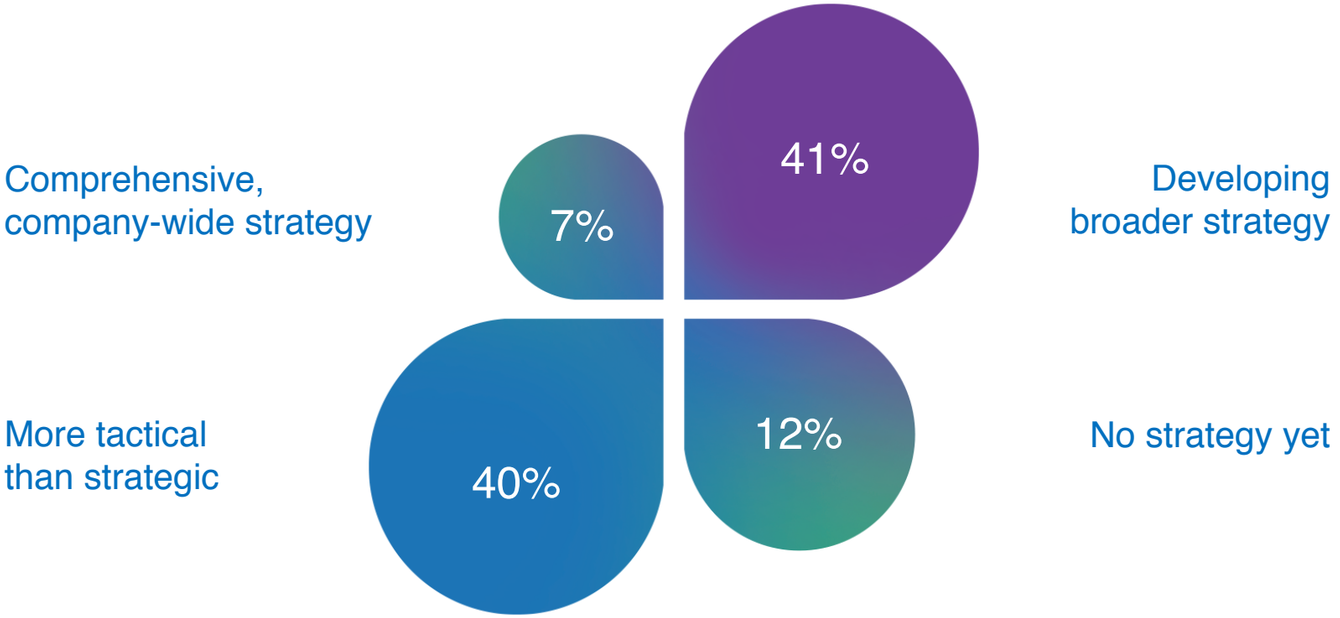
23% CEO/President

16% Chief Marketing Officer (CMO)

% citing as strong advocate

While these organizations view cognitive as essential, many still struggle with strategy and an adoption roadmap

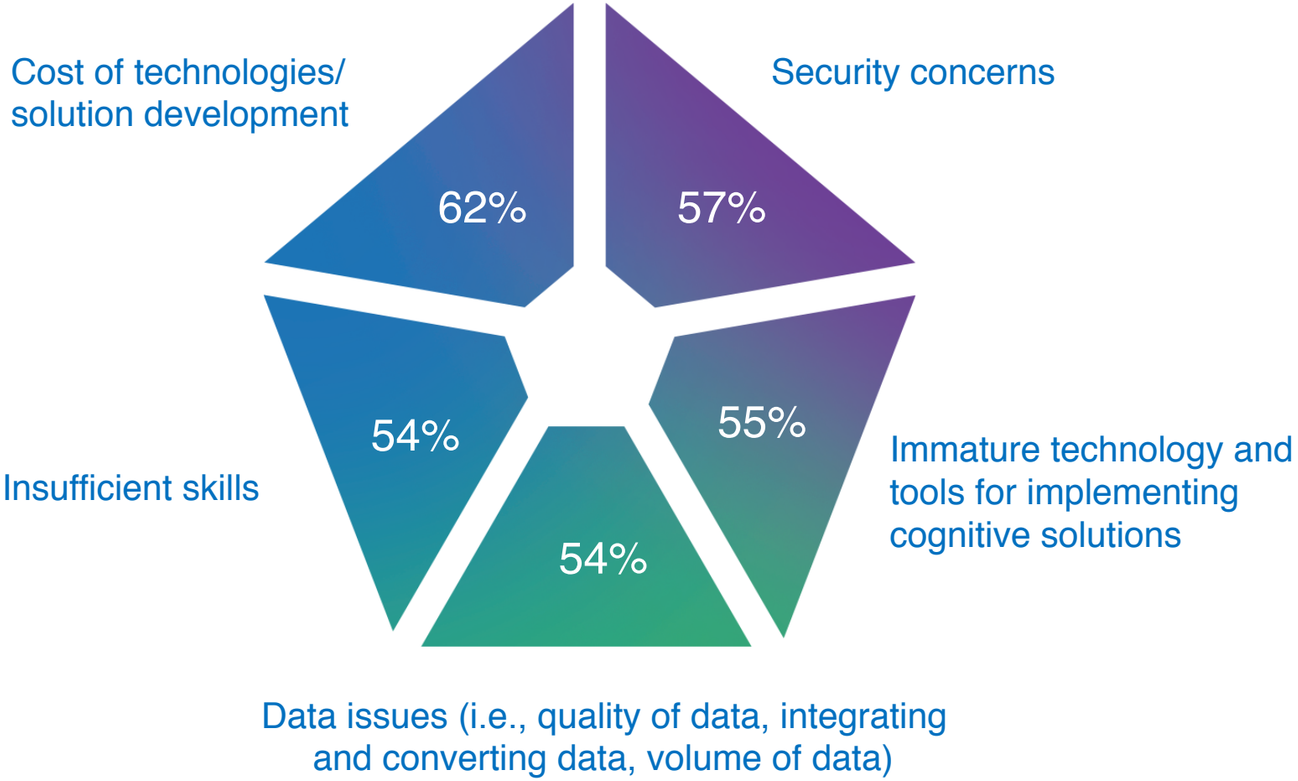
Organizational approach to cognitive



46% say that while their organization sees the value in cognitive computing, **they struggle with a roadmap for adoption**

Top adoption challenges include the cost of technology and security concerns

Top five challenges in adopting cognitive technologies



There is a prevalent skills gap for software developers and experts specializing in cognitive computing

Cognitive and IT skills are a challenge for implementing cognitive projects

53%	IT professionals focused on infrastructure, cloud, networking, etc.)
57%	Data experts (e.g., Data scientists, Data analysts)
58%	Domain experts (Subject matter experts with skills and expertise to train cognitive systems)
58%	Software developers who code/implement cognitive applications and systems
63%	Computer scientists (e.g., experts in artificial intelligence, machine learning, knowledge representation, other AI technaiques)

An ecosystem of experts, including IT companies and consultants, helps organizations with cognitive initiatives

	Technology Companies	Consulting Companies	External Developers	Developer Communities	Industry Analytics	Clients	Academia
To provide/build components of our product offerings	43%	37%	36%	32%	35%	31%	26%
To influence IT directions/ decisions	29%	30%	25%	20%	31%	25%	22%
To train our staff	34%	32%	30%	33%	27%	25%	29%

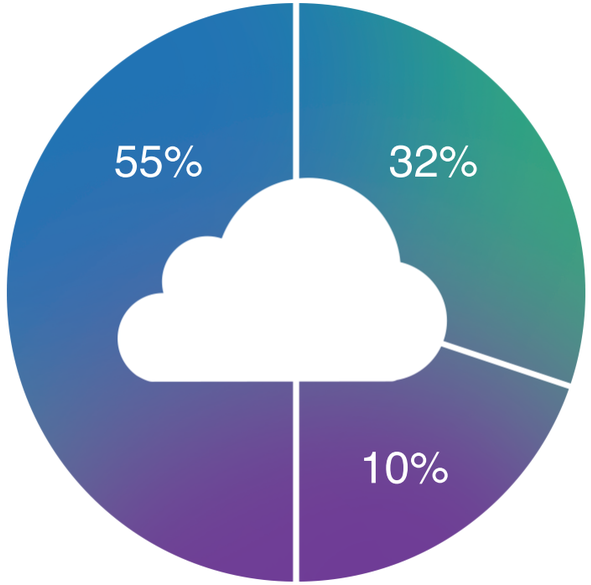
Cognitive early adopters take a holistic view of IT, with cloud, analytics and security enabling the cognitive era

9 in 10 say **each** of these will play an important role in their cognitive initiatives within 2 years:

- **Cloud**
- **Big data & analytics**
- **Mobile**
- **Security**

85% say **Internet of Things** (IoT) will play an important role in their cognitive initiatives within 2 years.

Cloud is the primary platform of choice for these organizations to drive cognitive projects



Cloud-based services are preferred to access and use cognitive capabilities

55% Favor cloud-based services (cognition-as-a-service) over non-cloud

32% Have an equal mix of cloud and non-cloud

10% Favor non-cloud over cloud-based

Both SaaS and PaaS are being leveraged for developing and deploying cognitive initiatives

53% of users access cognitive technologies via **software-as-a-service**

(SaaS - software/business processes and associated data are centrally hosted on a cloud)

51% of users access cognitive technologies via **platform-as-a-service**

(PaaS - development platform is centrally hosted on a cloud)

Cognitive early adopters expect to make significant use of open source technologies to support their cognitive initiatives

54% of cognitive early adopters already use or expect to make heavy use of open source technologies to support cognitive initiatives

Among developers, **74%** expect to make **heavy use of open source technologies**

Cognitive users blend diverse data types and sources in their cognitive initiatives

62% structured data vs. 38% unstructured data

Now:

51% use internal company data

48% use external data

43% use shared industry data

Future:

Over 90% plan to use each

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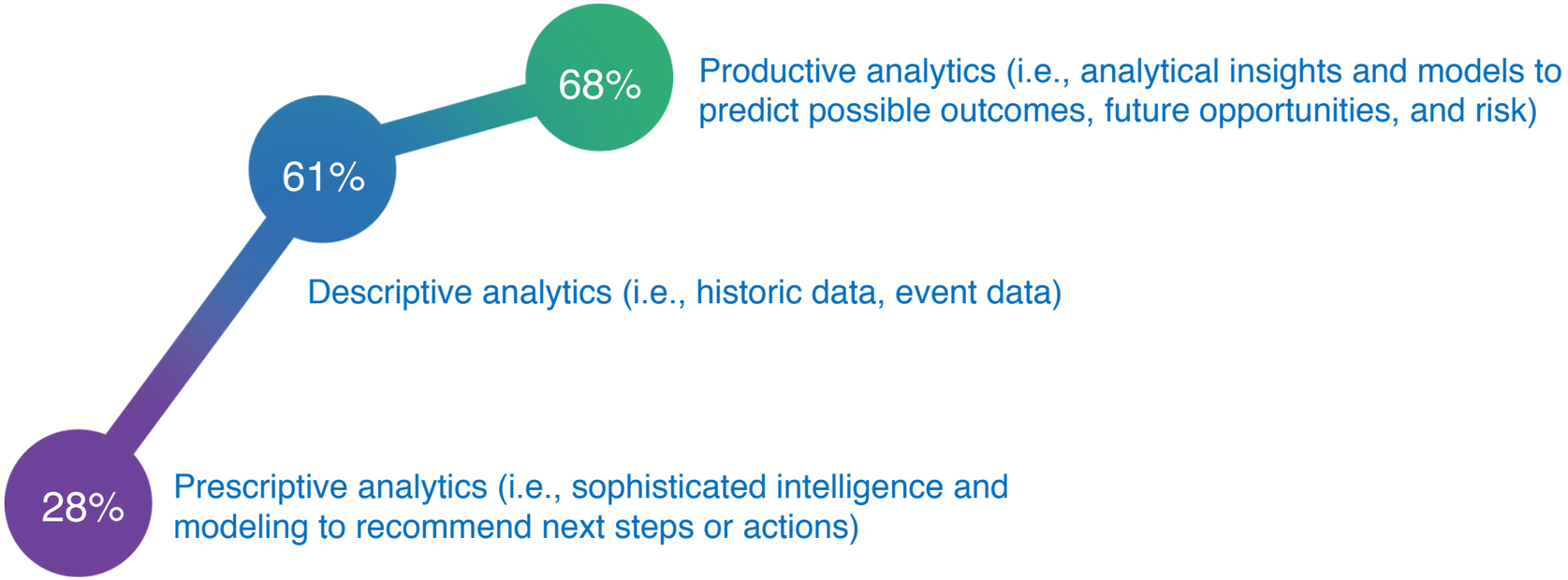
Cognitive early adopters are analytically mature organizations

Analytical capabilities used within the organization



42% **of Advanced Users are using Prescriptive analytics (vs. 24% of Planners/Beginners)**

Early adopters unlock insights by applying sophisticated analytics & cognitive technologies to diverse volumes of data

60% say cognitive computing is essential to tackling data challenges that conventional analytics cannot

53% say cognitive computing will unlock the hidden value of our organization dark data

Chart your cognitive computing roadmap

Choose your on-ramp

Determine your starting point for cognitive by considering your organization's needs and capabilities.

Target a use case with a strategic goal and data to support it.

Will you pursue enterprise-wide transformation, or improve a specific business process?

Advance your data strategy

The success of your cognitive initiative will depend on the volume and quality of data at your disposal.

Consider leveraging a diverse range of untapped data sources based on your business need—from structured to unstructured, and from internal to external sources.

Team for success

Encourage your IT and business leaders to collaborate on the organization's cognitive initiatives.

Enlist a team of cognitive, software development and data specialists to implement and manage cognitive pilots.

Supplement your in-house expertise by reaching out to your broader ecosystem including technology and consulting companies, external developers and industry analysts.

Cognitive early adopters already gain major competitive advantage and business results

65% of cognitive early adopters say adopting cognitive is very important to their organization's strategy and success

58% of cognitive early adopters say cognitive computing is essential to the digital transformation of organizations

50% of cognitive users say they already gain significant competitive advantage from their cognitive initiatives

Top goals for cognitive adoption

- Improve productivity and efficiency
- Reduce costs
- Improve decision making and planning

Top results achieved by users

- Improved productivity and security
- Improved security and compliance risk reduction
- Enhanced learning experience

Patterns of adoption are emerging as organizations kickstart cognitive initiatives:

1. Departmental patterns
   - IT
   - Data Analytics
2. Goal-based patterns
   - Product and service innovation
   - IT Automation
3. Technology patterns
   - Automated scheduling and planning
   - Pattern recognition

Cognitive early adopters take a holistic view of IT: **8 of 10** say **cloud**, **analytics** and **security** will play an important role in cognitive initiatives within 2 years

53% say cognitive computing will unlock the hidden value of our organization's dark data

While IT and LoB collaborate on cognitive decision making, technology leaders are the key advocates

About the study

Geography

United States	China	Gernamy	Japan	Germany	United Kingdom
33%	17%	16%	14%	10%	10%

Role

Manager	Non Manager	C-Level	Corporate Executive	Director
40%	10%	10%	16%	24%

Industry

Note: Other industries account for 35%

Baking	Professional Services	Production/ Manufacturing	Financial Markets	Retail	Consumer Products	Healthcare Provider	Electronics
13%	10%	9%	8%	8%	6%	6%	5%

To smooth possible geographic distortions, responses were weighted based on an IBM assessment of each country's total IT spend.
Survey included 55% line of business and 45% IT respondents. 54% respondents were from large enterprise and 46% small and medium businesses.

Top outcomes achieved vary by industry, from increased market agility to increased customer engagement

Top outcomes achieved across industry by cognitive users

Finance (n=105)

49% Increased market agility

47% Improved customer service

43% Increased customer engagement

43% Improved productivity and efficiency

Retail (n=35)

57% Increased customer engagement

57% Personalized customer/user experience

56% Improved decision making

56% Reduced costs

55% Improved customer service

53% Improved productivity and efficiency

51% Expanded business into new markets

Health (n=51)

65% Accelerated innovation of new products/ services

64% Improved productivity and efficiency

64% Improved security

62% Reduced costs

57% Improved customer service

57% Expanded business into new markets

57% Personalized customer/user experience

57% Expanded ecosystem

At an industry level, unique use cases are evident from product and service innovation to decision support systems

Top goal-based based use cases by cognitive users across industry

Finance (n=105)

41% Product and Service Innovation

41% Asset Management

40% Smart Machines

40% Cust. Behavior & Sentiment Analysis

Retail (n=35)

39% Procurement & Supply Chain Operations

39% Sales and Marketing Optimization

38% Research and Discovery

37% Customer Service

Health (n=51)

61% Decision Support Systems

59% Procurement and Supply Chain Operations

58% Security and Compliance

58% IT Automation

55% Performance and Quality Management

54% Product and service innovation

52% Customer service