Gartner Research

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Most Valuable Technologies: Survey Results for Emerging-Technology Adoption and Management

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Three surveys conducted during 2008 and 2009 looked at:

- Emerging-technology adoption, value and management activities within 444 U.S. organizations across 15 industries
- Future expectations for five key technologies in 269 organizations
- Attitudes toward innovation activities among emerging-technology executives

Key Findings

- More than half of all enterprises already use four key emerging technologies: PC virtualization, instant messaging, desktop videoconferencing and blogging.
- Cloud computing is the most evaluated technology, with biometric identification, surface/multitouch computers, PC virtualization and desktop videoconferencing close behind.
- The majority of enterprises rated nine emerging technologies as high value, including radio frequency identification (RFID), mobile robots and 3D printers.
- Social technologies dominate the majority of "low value" ratings, including social computing platforms, microblogging and blogging.
- Every technology provides value when applied appropriately. All the technologies have at least 20% of users claiming high value.
- Early adopters spend up to 30% of their IT budgets on emerging technologies, while others are most commonly in the 2% to 5% range.
- Enterprises show a growing commitment to and confidence in innovation, although the focus of innovation activities has shifted to cost reduction and shorter-term returns. Dedicated emerging-technology groups have become more common during the past five years.

Recommendations

- Ensure that your emerging-technology processes are solid, and that the required levels of business focus and participation are in place, to maintain high levels of confidence in innovation and emerging technologies.
- If resources allow, consider a dedicated emerging-technology function.

- Compare your adoption levels to those of your peers in terms of your enterprise personality — Type A (aggressive), Type B (moderate) or Type C (conservative) — as well as your industry (see the figures in the Appendix of this research).
- Manage expectations for cloud computing, as it is currently at the Peak of Inflated Expectations in Gartner's Hype Cycle, according to analyst estimates and client polls. Understand its potential value, as well as likely risks and challenges, so that you can have informed and realistic internal dialogue in the face of massive external hype.
- Examine the following technologies for potentially high value to your organization: enterprise instant messaging, video telepresence, business rule engines, desktop videoconferencing, PC virtualization, 3D printers, mobile robots, item-level RFID and biometric identification for employees.

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1.0 Survey Background

This research presents the results of three surveys conducted between October 2008 and August 2009 on the topics of technology adoption, value and expectations, and emerging-technology management and funding.

The majority of the results are from Gartner's 2008 Technology Adoption and Value Survey, which asked 444 U.S. organizations about their level of adoption of 37 emerging technologies. The survey also featured questions about the organizations' style of management and level of funding for emerging technologies.

The respondents were drawn from 15 industries, with at least 26 companies from each (except media at 19 respondents). Each respondent could select only one industry. The respondents were not necessarily Gartner clients, but qualified for the survey by answering that that they were personally responsible for or very knowledgeable about the planning, evaluation or selection of emerging technologies within their organization. They were balanced across company size to favor the larger organizations that constitute much of Gartner's client base, but to also include a portion of smaller companies (see Table 1).

Table 1. Percentage of Respondents by Company Size

Revenue	Respondents
$5 billion or more	35%
$1 billion to less than $5 billion	30%
$100 million to less than $1 billion	18%
Less than $100 million	17%

Source: Gartner (November 2008)

These survey results are augmented with two smaller-scale polls in 2009 regarding technology and management topics, as described in Sections 5 and 6.

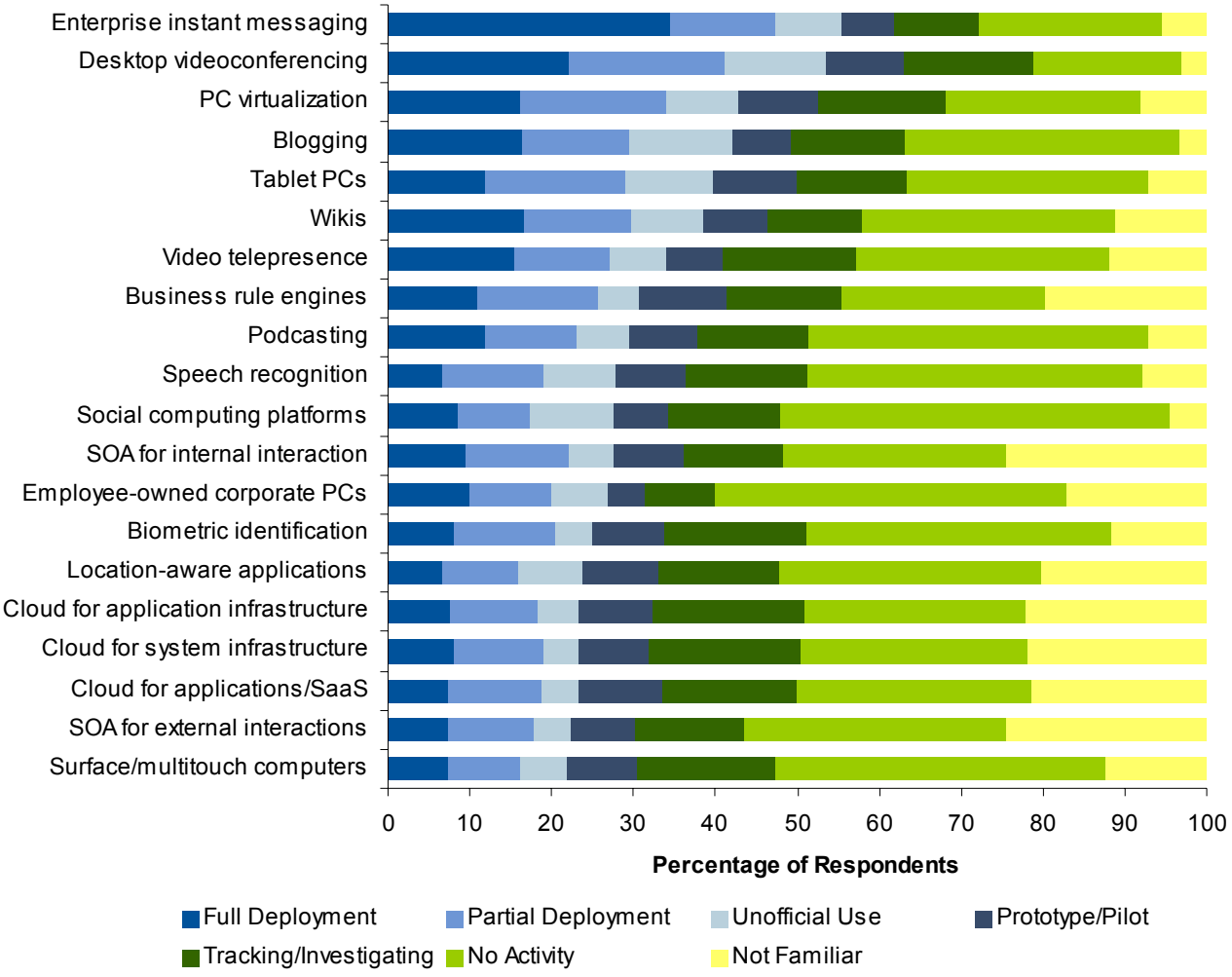
2.0 Technology Adoption Results

For each of the 37 technologies in the Technology Adoption and Value Survey, respondents were asked to indicate which of the following stages most closely categorized their activity:

- Full-scale deployment
- Partial deployment
- In use, but not officially sanctioned or managed
- In prototyping or piloting
- Tracking or actively investigating
- Familiar but not doing anything currently
- Not familiar with this technology

Only enterprise instant messaging and desktop videoconferencing were in full-scale deployment by more than 20% of respondents (see Figure 1). Partial and unofficial deployments boosted the numbers considerably, with PC virtualization and blogging joining enterprise instant messaging and desktop videoconferencing at more than 50% adoption, and tablet PCs, wikis, video telepresence and business rule engines in use by more than 40% of organizations. See Figure 8 for the full listing of technology adoption levels. Note that the percentages refer to the number of organizations that have adopted, not the number of individual users within each organization.

Figure 1. Technologies Adopted by More Than 20% of Respondents (Including Full, Partial and Unofficial Deployments)



Source: Gartner (November 2008)

The most active areas of technology evaluation — including prototyping/piloting and tracking/actively investigating — were all forms of cloud computing. A wide range of other technologies were also under evaluation by more than 20% of respondents (see Table 2).

Table 2. Technologies Under Evaluation by More Than 20% of Respondents

Technology	Percentage of Respondents Evaluating
Cloud for application infrastructure	27.70
Cloud for system infrastructure	27.25
Cloud for applications/SaaS	26.58
Biometric identification	26.13
Surface/multitouch computers	25.45
PC virtualization	25.45
Desktop videoconferencing	25.45
Business rule engines	24.77
Location-aware applications	24.10
Tablet PCs	23.87
Speech recognition	23.65
Video telepresence	23.20
Ideation/idea management (internal)	22.52
Social network analysis	22.52
Podcasting	21.85
SOA for external interactions	21.17
Blogging	21.17
SOA for internal interaction	20.72
Social computing platforms	20.50
Item-level RFID	20.05

Source: Gartner (November 2008)

3.0 Technology Adoption by Enterprise Personality

As part of the survey, organizations selected their enterprise personality based on how aggressive they are toward technology adoption. The distribution was as follows:

- Type A: Aggressive (willing to adopt technologies while relatively new and risky) — 20% of respondents
- Type B: Mainstream (adopt maturing technologies with manageable risk) — 54% of respondents
- Type C: Conservative (adopt only proven technologies) — 26% of respondents

The priority of technologies adopted is relatively consistent across the different types of organization, but the levels of adoption are very different (see Figures 9 through 11). Typical profiles for Type A, B and C organizations are shown in Table 3. As expected, organizations that identify themselves as Type A have higher levels of adoption than Type B or C organizations.

Table 3. Profiles for Type A, B and C Organizations

	Deployment Profile	Evaluation Profile
Type A	More than 40% have deployed desktop videoconferencing, PC virtualization, enterprise instant messaging, blogging, wikis, video telepresence, tablet PCs and cloud for applications/software as a service (SaaS).	More than 25% are evaluating cloud for application infrastructure, cloud for system infrastructure, business rule engines, pallet-level RFID, customer-facing virtual worlds, internal ideation/idea management, prediction markets, social computing platforms, social network analysis and cloud for applications/SaaS.
Type B	More than 30% have deployed enterprise instant messaging, desktop videoconferencing, tablet PCs, blogging, PC virtualization, wikis, video telepresence and business rule engines.	More than 25% are evaluating biometric identification, cloud for system infrastructure, cloud for application infrastructure, cloud for applications/SaaS, surface/multitouch computers, PC virtualization, desktop videoconferencing, blogging, social network analysis, tablet PCs, business rule engines and internal ideation/idea management.
Type C	More than 20% have deployed enterprise instant messaging, desktop videoconferencing, blogging, table PCs and video telepresence.	Less than 25% are evaluating any of the included technologies. The top evaluation candidates (between 20% and 25% of respondents) were surface/multitouch computers, desktop videoconferencing, location-aware applications, PC virtualization, video telepresence, speech recognition, tablet PCs and cloud for applications/SaaS.

Source: Gartner (November 2008)

4.0 Survey Results by Industry

There are significant differences in the adoption and investigation of technologies across industries — in the specific technologies deployed and in the level of aggressiveness in deploying newer technologies in general (see Figures 12 through 26).

Although there is considerable commonality among the most-adopted technologies, every industry had at least two technologies in their top 10 that did not appear in the all-industry top 10 list in Figure 1. Table 2 shows technologies in each industry's top 10 deployed technologies (including full, partial and unofficial deployment) that are not in the all-industry top 10 list. The largest differences were in manufacturing, which included RFID and surface computers, and services, which included virtual agents/chatbots and audio search/speech analytics (see Table 4). This represents somewhat more variety than we saw in our last similar survey in 2005, possibly indicating a greater focus on business-facing technologies.

Table 4. Industry Adoption Profiles

Industry	Difference From Average Top 10 Activity
Banking	Biometric identification, ideation/idea management (internal), SOA for internal interaction
Education	Social computing platforms, cloud for applications/SaaS
Energy and Utilities	Employee-owned corporate PCs, cloud for application infrastructure
Financial Services	Employee-owned corporate PCs, cloud for application infrastructure, cloud for system infrastructure

Industry	Difference From Average Top 10 Activity
Federal and National Government	Biometric identification, SOA for internal interaction, item-level RFID
Local and State Government	Cloud for application infrastructure, cloud for system infrastructure
Healthcare Providers	Biometric identification, employee-owned corporate PCs, virtual agents/chatbots
Insurance	SOA for internal interaction, SOA for external interactions
IT Services	Social computing platforms, employee-owned corporate PCs
Manufacturing	Employee-owned corporate PCs, pallet-level RFID, item-level RFID, SOA for external interactions, surface/multitouch computers
Media	Social computing platforms, microblogging, virtual agents/chatbots
Services	Social computing platforms, location-aware applications, virtual agents/chatbots, employee-owned corporate PCs, audio search/speech analytics
Retail	Social computing platforms, employee-owned corporate PCs, microblogging
Telecommunications	Social computing platforms, SOA for internal interaction, social network analysis
Transportation	Pallet-level RFID, biometric identification, location-aware applications, SOA for internal interaction

Source: Gartner (November 2008)

We measured the level of aggression with respect to technology adoption in each industry by adding the total percentage of adoption (full, partial or unofficial) across all technologies. The most aggressive industries were telecommunications, services (excluding IT and financial services) and education. The least aggressive were retail, healthcare providers, and state and local government (see Table 5).

Table 5. Technology Aggressiveness by Industry (From Highest to Lowest)

Rank	Industry
1	Telecommunications
2	Services
3	Education
4	Transportation
5	IT Services
6	Banking
7	Financial Services
8	Manufacturing
9	Federal and National Government

Rank	Industry
10	Energy and Utilities
11	Media
12	Insurance
13	State and Local Government
14	Healthcare Providers
15	Retail

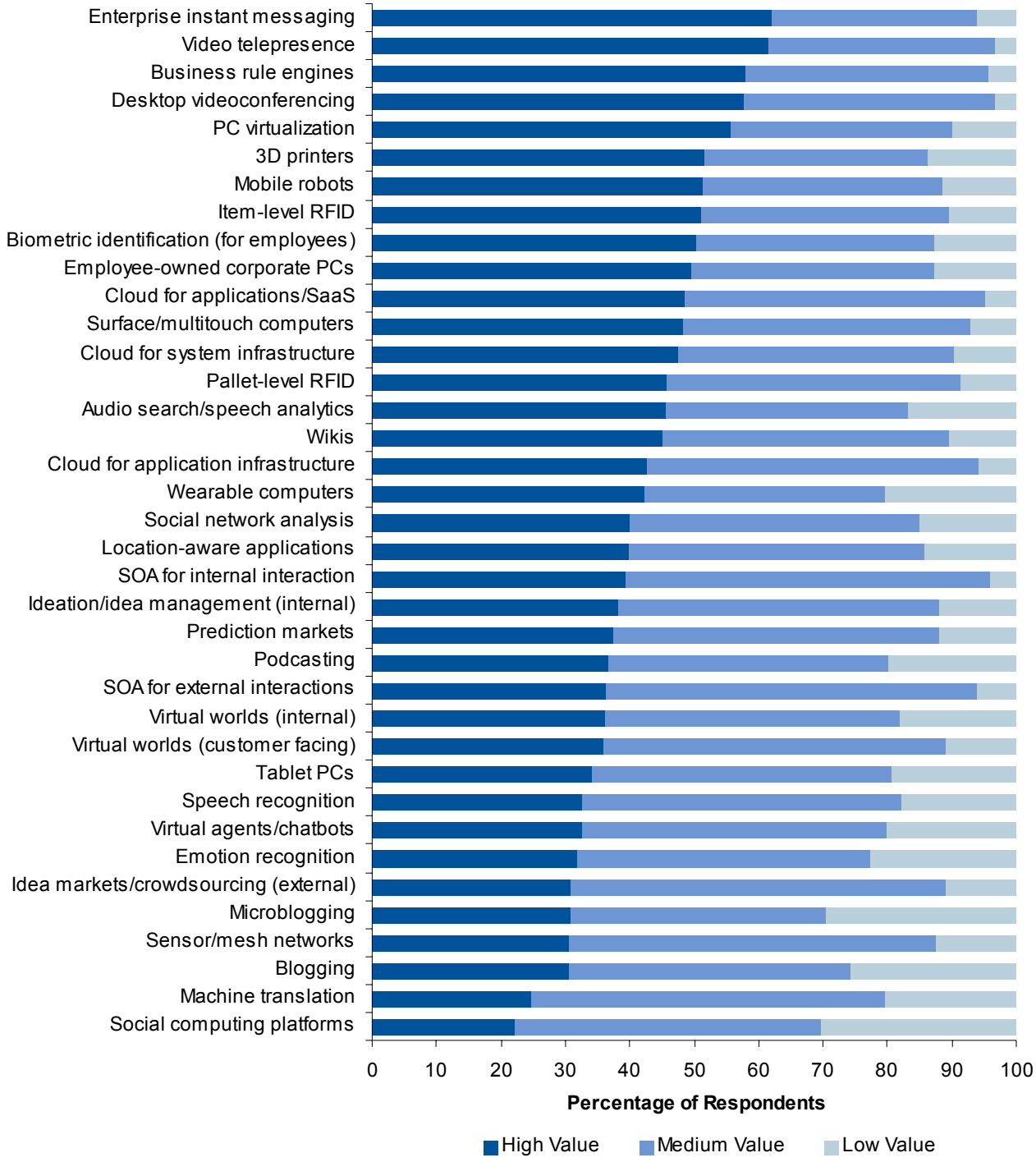
Source: Gartner (November 2008)

We also examined the levels of "maverick" behavior, as indicated by the extent of unofficial adoption of technology. The service industries were the most maverick on this basis — services, IT services and financial services. The least maverick were state and local government, insurance and banking. Taking unofficial deployment as a percentage of total deployment bumped retail and healthcare providers to the top of the list, because these industries had a low level of overall deployment.

5.0 Value of Technology

Respondents that indicated that their organization had deployed a technology were asked to assess whether their organization had achieved high, medium or low value from their deployments (see Figure 2). Because only organizations that had deployed answered this question, the number of respondents for each row of the chart varies (from 246 respondents that have adopted enterprise instant messaging, down to 35 that have adopted mobile robots).

Figure 2. Adopted Technologies Ranked by Highest to Lowest Value



Source: Gartner (November 2008)

The technologies ranked as having high value by more than half of the respondents included enterprise instant messaging, video telepresence, business rule engines, desktop

videoconferencing, PC virtualization, 3D printers, mobile robots, item-level RFID and biometric identification for employees.

Particularly noteworthy are the highly valued technologies that showed up low in terms of adoption — mobile robots and 3D printers. This finding shows the potential advantage of adopting a technology early that may be less mature, but that is highly relevant to your business.

The technologies rated as low value by more than 20% of respondents were social computing platforms, microblogging, blogging, emotion recognition, wearable computers, machine translation and virtual agents/chatbots. The prevalence of Web 2.0 technologies in this list is most likely attributable to the fact that they were overhyped. Thus, they were adopted in many organizations because of a sense of "everybody's doing it" rather than as a result of alignment with business need. Note, however, that all these technologies also had a different 20% (at least) of respondents indicating that they had obtained "high value," showing that all these technologies can bring benefits when applied in the right way.

In a poll conducted as part of a Gartner Webinar in August 2009, attendees were asked about their future expectations of value for five technologies featured on the 2009 Hype Cycle for Emerging Technologies. In the 269 responses, the percentage that picked each technology as generating "the most value for your organization during 2010 to 2011" is shown in Table 6.

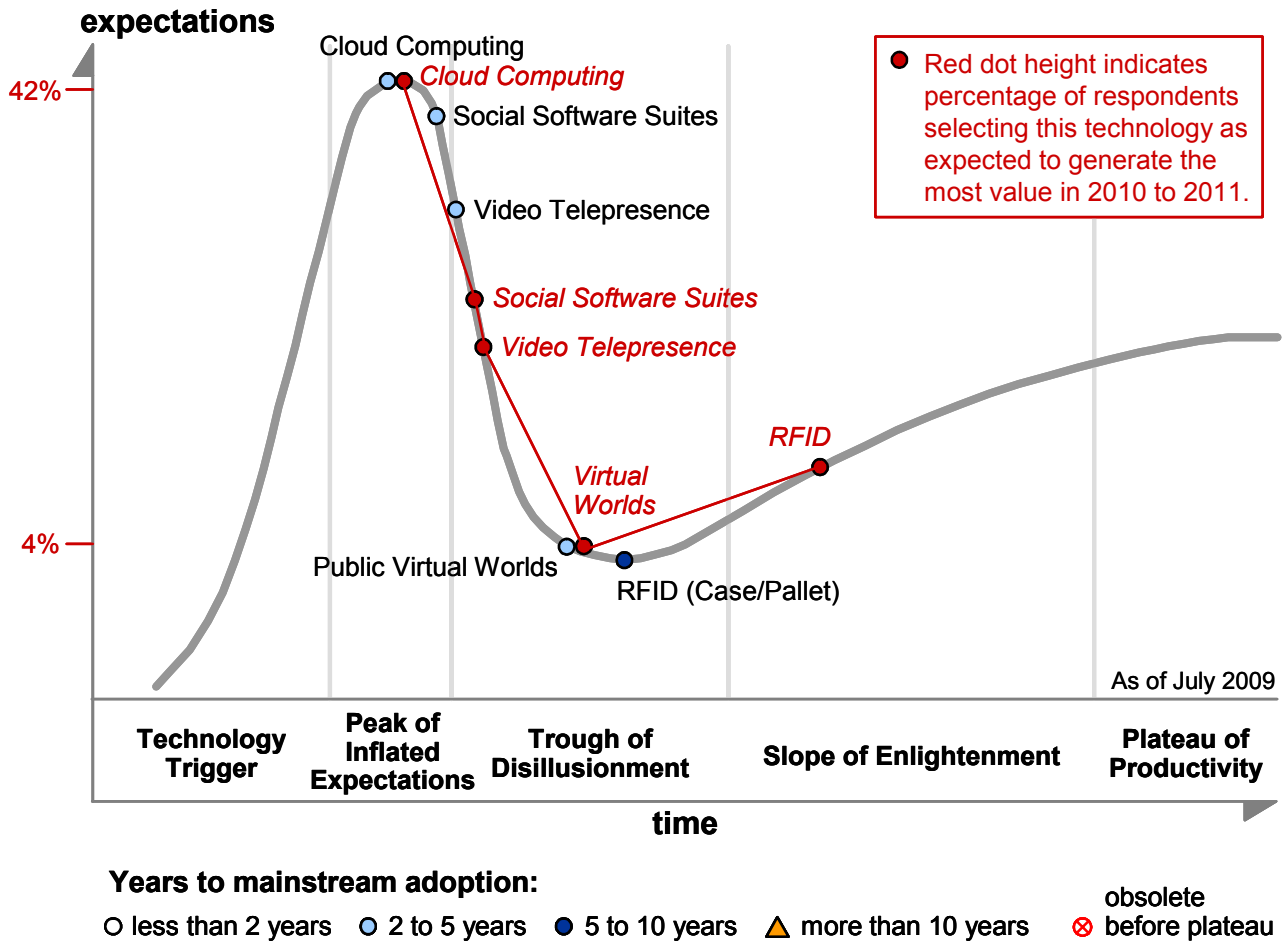
Table 6. Expectation of Value During 2010 to 2011

Technology	Percent of Respondents Selecting This Technology as Generating the Most Value From 2010 to 2011
Cloud computing	42%
Social software suites	24%
Video telepresence	20%
RFID	10%
Virtual worlds	4%

Source: Gartner (August 2009)

Unlike the value assessments in Figure 2, which were based on the experience of those who had already adopted, the results in Table 6 reflect the future expectations, regardless of actual experience with the technologies. When we match the relative expectations for these technologies against those estimated by Gartner analysts in the Emerging Technology Hype Cycle, the positions are relatively consistent (see Figure 3).

Figure 3. Survey Value Expectations Compared With Gartner Hype Cycle Estimates



Source: Gartner (August 2009)

In this figure, we have manually ordered the technologies horizontally according to maturity level as determined in the Hype Cycle, and calibrated the vertical positioning to align with the highest entry (cloud computing) and the lowest entry (virtual worlds) on each. The relative height of each of the red dots is based on the percentages in Table 6. Social software suites and video telepresence have a greater separation from cloud computing than in the Hype Cycle, but are in approximately the same position in relation to each other. RFID shows higher expectations relative to virtual worlds, which may indicate the start of its climb up the Slope of Enlightenment.

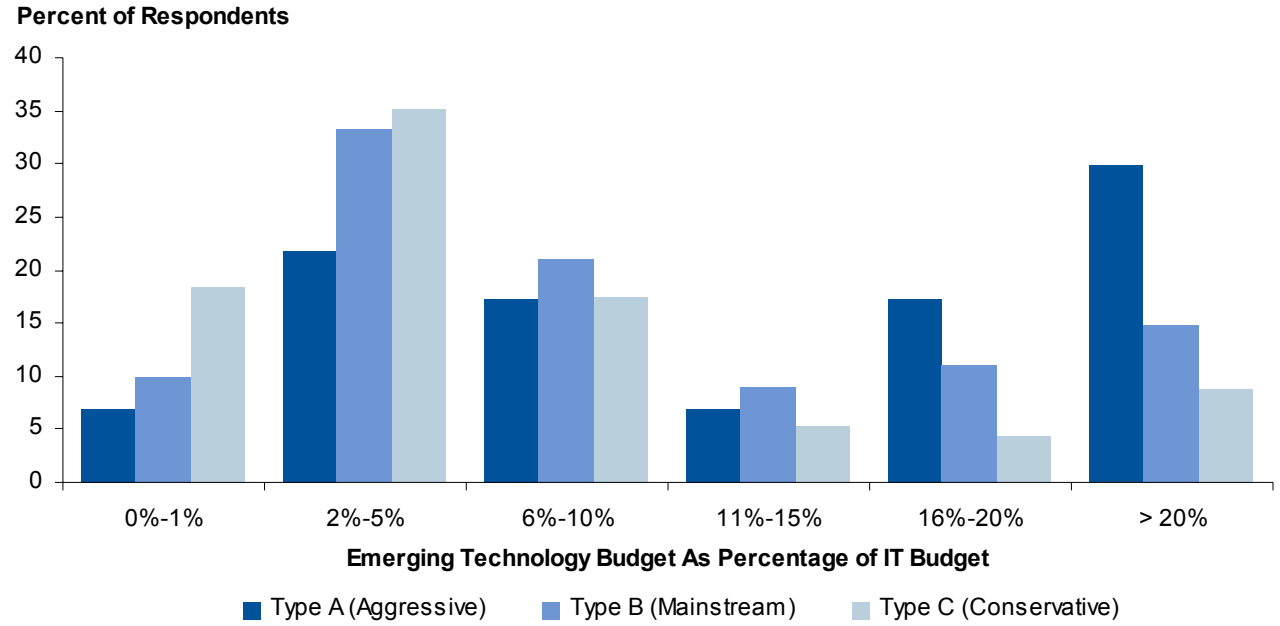
For further discussion on measuring the y-axis of the Hype Cycle, see "The New Hype Cycle Y-Axis Measure: Expectations."

6.0 Organizing and Funding Emerging Technologies

Figure 4 shows the levels of funding for emerging technologies, based on comparing each organization's total IT budget for fiscal-year 2008 against its "total annual budget for emerging technologies (for tracking, evaluating and piloting unproven or immature technologies)." As expected, Type A organizations have overall higher percentages of investment in emerging technologies, with more than 30% of Type A organizations investing more than 30% of the IT

budget on emerging technologies. For Type B and C organizations, 2% to 5% of the IT budget is the most common level of spending.

Figure 4. Emerging-Technology Budget as a Percentage of the IT Budget



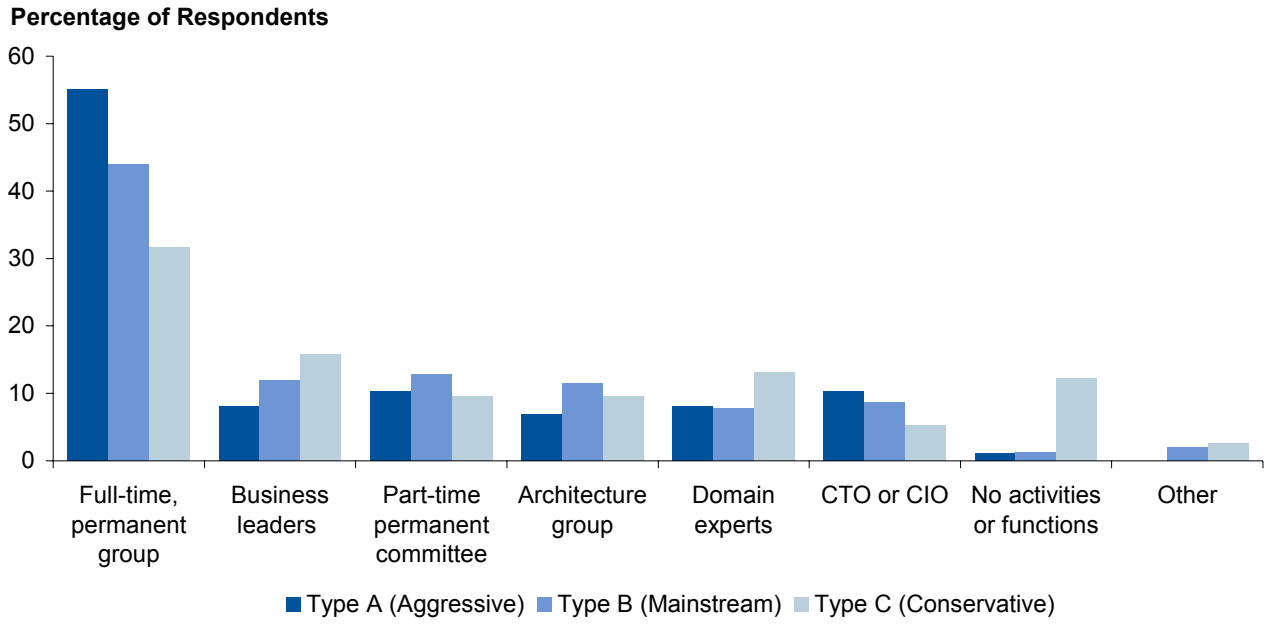
Source: Gartner (November 2008)

Respondents were asked to indicate who was primarily responsible for identifying and assessing emerging technologies in their organizations:

- A full-time, permanent group with the responsibility for emerging technologies
- A part-time but permanent committee or team with the responsibility for emerging technologies
- The architecture group with the responsibility for emerging technologies
- Domain experts with the responsibility for identifying advances in their own technology areas
- Business leaders with the responsibility for identifying technology advances relevant to their own business issues
- CTO or CIO with ad hoc support
- To my knowledge, we have no activities or functions involving new or emerging technologies
- Other

Figure 5 shows the distribution of responses by Type A, B and C organizations. A majority of organizations in this survey have responsibility assigned to a full-time permanent group. As expected, Type A organizations have a higher incidence of full-time activity than less-aggressive organizations.

Figure 5. Responsibility for Emerging Technologies by Enterprise Personality



Source: Gartner (November 2008)

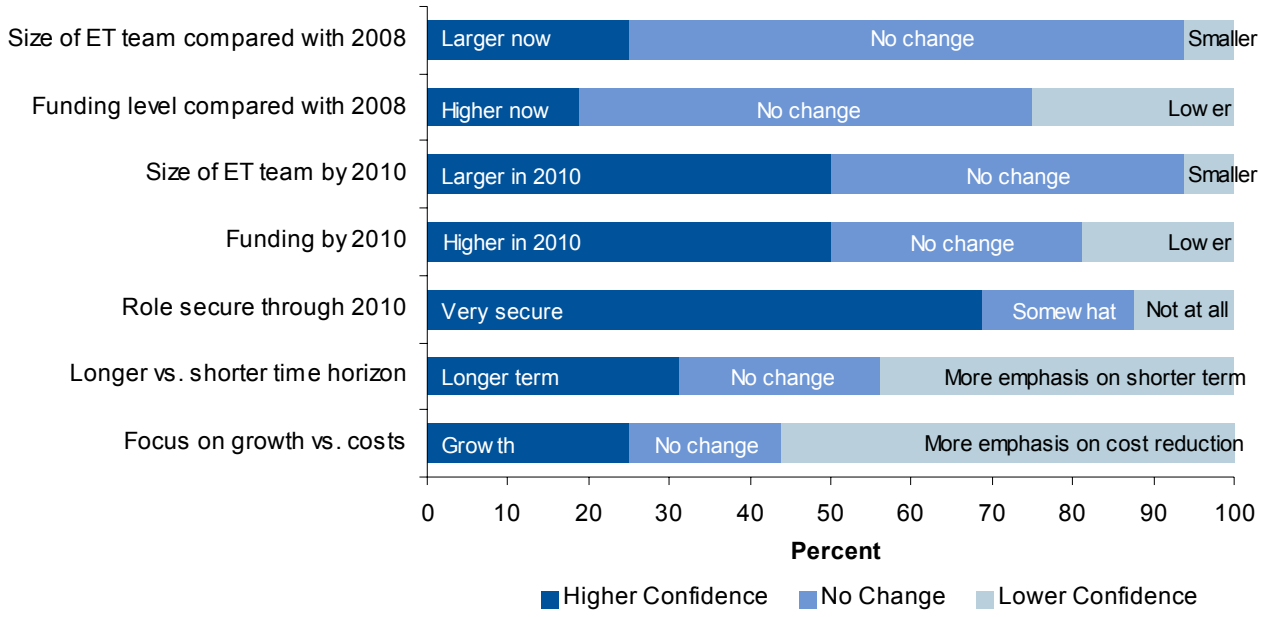
Compared with similar surveys conducted during the past 10 years, this survey shows that the prevalence of full-time groups responsible for emerging technologies has increased significantly (43%, compared with 19% in 2005, 28% in 2001 and 27% in 1998). At least some of this difference can be attributed to a change in the wording of the question. In previous surveys, respondents were asked whether they had a full-time, permanent group "dedicated to" emerging technologies, whereas in the 2008 survey, they were asked if there was a full-time group with "responsibility for" emerging technologies, which could potentially include groups with other responsibilities. However, the trend indicated here is in line with the experience of Gartner analysts covering emerging technologies and innovation, where we see growing levels of interest from Gartner clients in formalizing emerging-technology activities.

7.0 Emerging-Technology Confidence Index

At a U.S. best-practice meeting in February 2009, we polled 16 emerging-technology managers and CTOs about recent and planned changes in the resourcing and focus of their emerging-technology activities.

Figure 6 shows the results of the poll. In more than 90% of the organizations, the size of the emerging-technology function was growing or experiencing no change from the previous year and for the upcoming year. Most had not experienced any change in funding from a year ago, and half were projecting a growth in funding for 2010. Most of the managers felt very secure that their role in emerging technologies would still exist in 2010.

Figure 6. Results From 2009 Poll of Emerging-Technology Managers

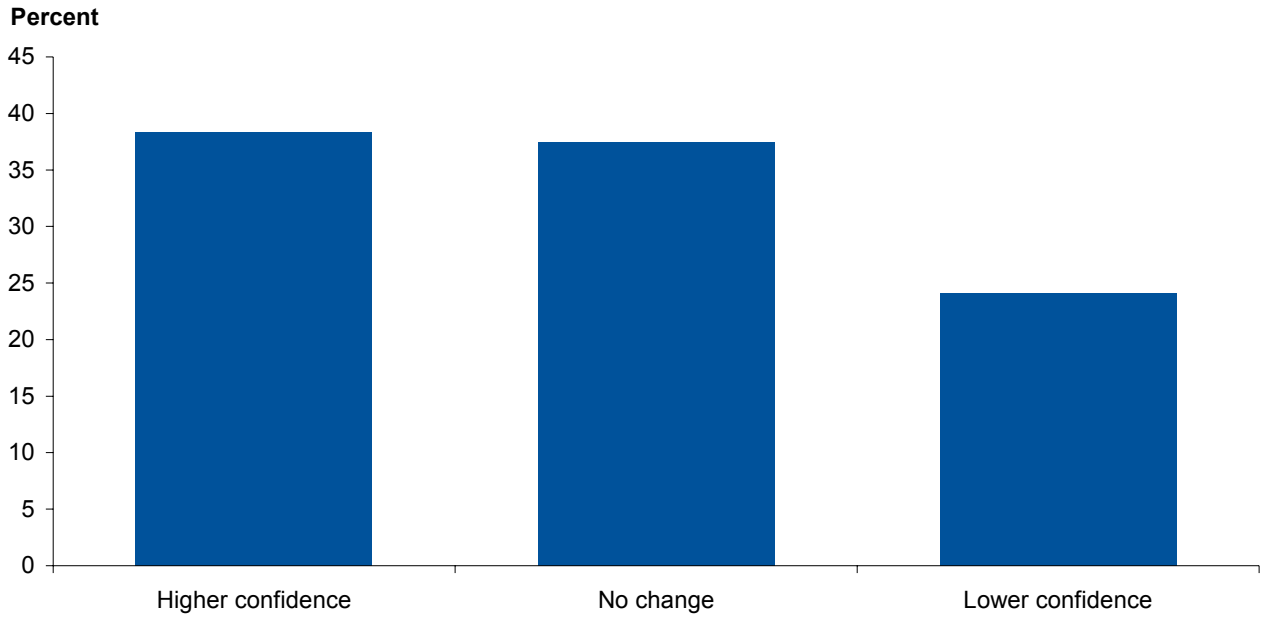


Source: Gartner (February 2009)

Although the projected outlook for emerging-technology activities is positive, the focus of those activities shows significant change. In particular, more than 50% of the respondents are placing more emphasis on applying emerging technologies to reduce costs. The smallest portion (19%) are maintaining the current balance, with the remaining 25% redirecting their efforts more toward driving business growth and generating revenue. Similarly, more than 40% are placing more emphasis on shorter-term initiatives, while around 30% are moving toward longer-term initiatives.

We grouped the responses from Figure 6 according to whether they indicate higher confidence (the dark blue responses, such as "larger team" and "higher funding"), no change, or lower confidence (the light blue responses, such as "smaller team" and "lower funding"). Figure 7 shows the results. Overall, the level of confidence in continued investment in emerging technologies was high. However, as with many similar polls and surveys, the participants are not necessarily representative of all organizations. In this case, the organizations already had a level of commitment to emerging technology that included appointing a manager to oversee the function, and attending a best-practice council.

Figure 7. Composite Emerging-Technology Confidence Index



Source: Gartner (February 2009)

8.0 Recommendations

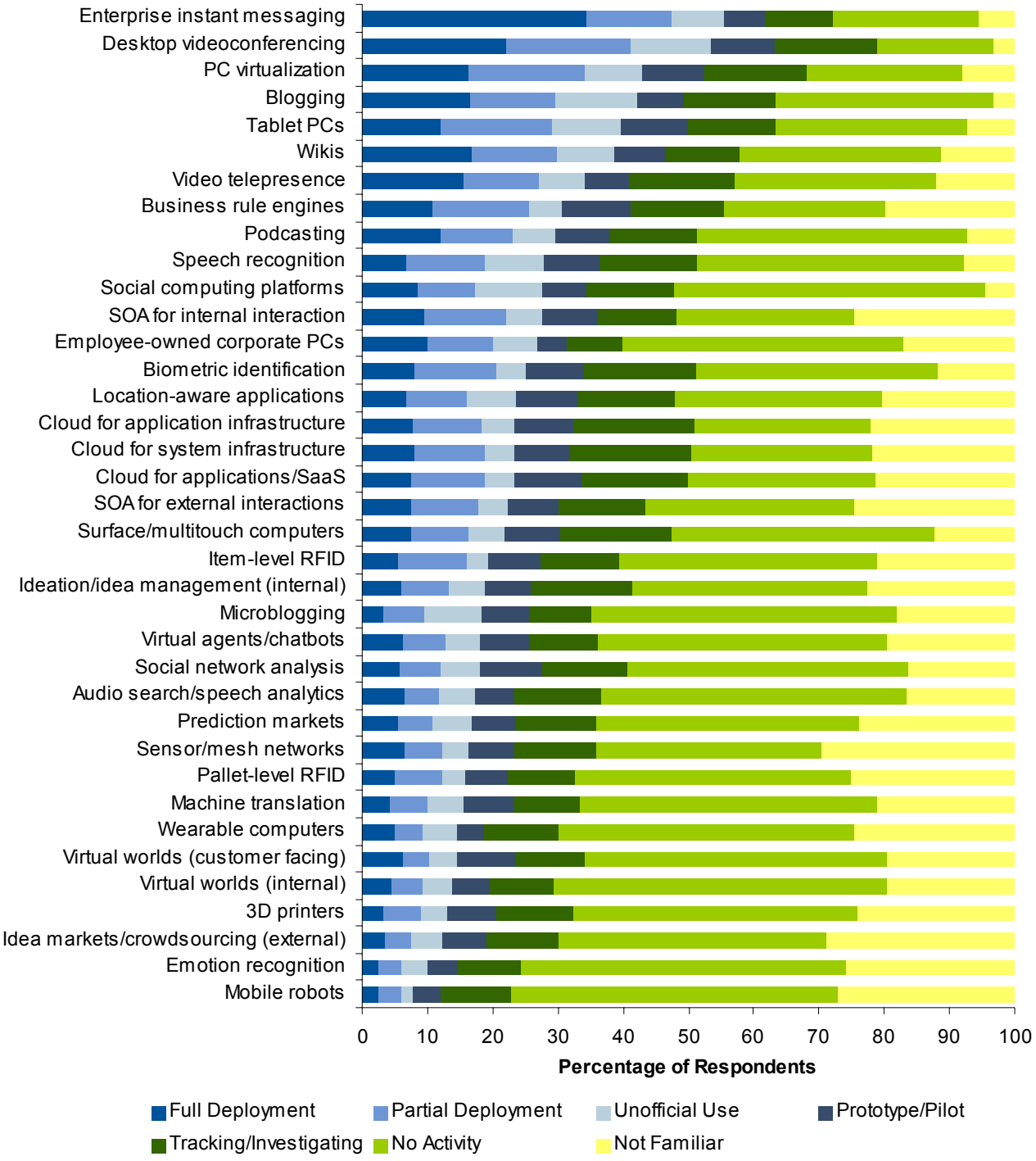
If they are to remain competitive, companies cannot afford to relax their focus on innovation and the role that emerging technologies can play in driving that innovation. Innovation activities should be applied to the most-critical organizational objectives, which may include cost cutting as well as growth goals. To maintain high levels of confidence, emerging-technology groups should ensure that their processes are solid, and that the required levels of business focus and participation are in place, because it is particularly important to sustain the quality and value proposition in a cost-cutting environment. If resources allow, consider a dedicated emerging-technology function. These can be effective even with a small number of staff (for example, three to five full-time staff).

Organizations should take the following specific actions in their emerging-technology initiatives:

- Identify your enterprise personality as Type A (aggressive), Type B (moderate) or Type C (conservative), and compare your adoption levels to those of your peers in Figures 9 to 11. Also, pay particular attention to the technologies that are being adopted by others in your industry, as shown in Figures 12 to 26.
- Manage expectations for cloud computing, because it is at the Peak of Inflated Expectation in Gartner's Hype Cycle, according to analyst estimates and client polls. Understand its potential value, as well as likely risks and challenges, so that you can have informed and realistic internal dialogue in the face of massive external hype.
- Examine the following technologies for potentially high value to your organization: enterprise instant messaging, video telepresence, business rule engines, desktop videoconferencing, PC virtualization, 3D printers, mobile robots, item-level RFID and biometric identification for employees.

9.0 Appendix: Technology Adoption Figures

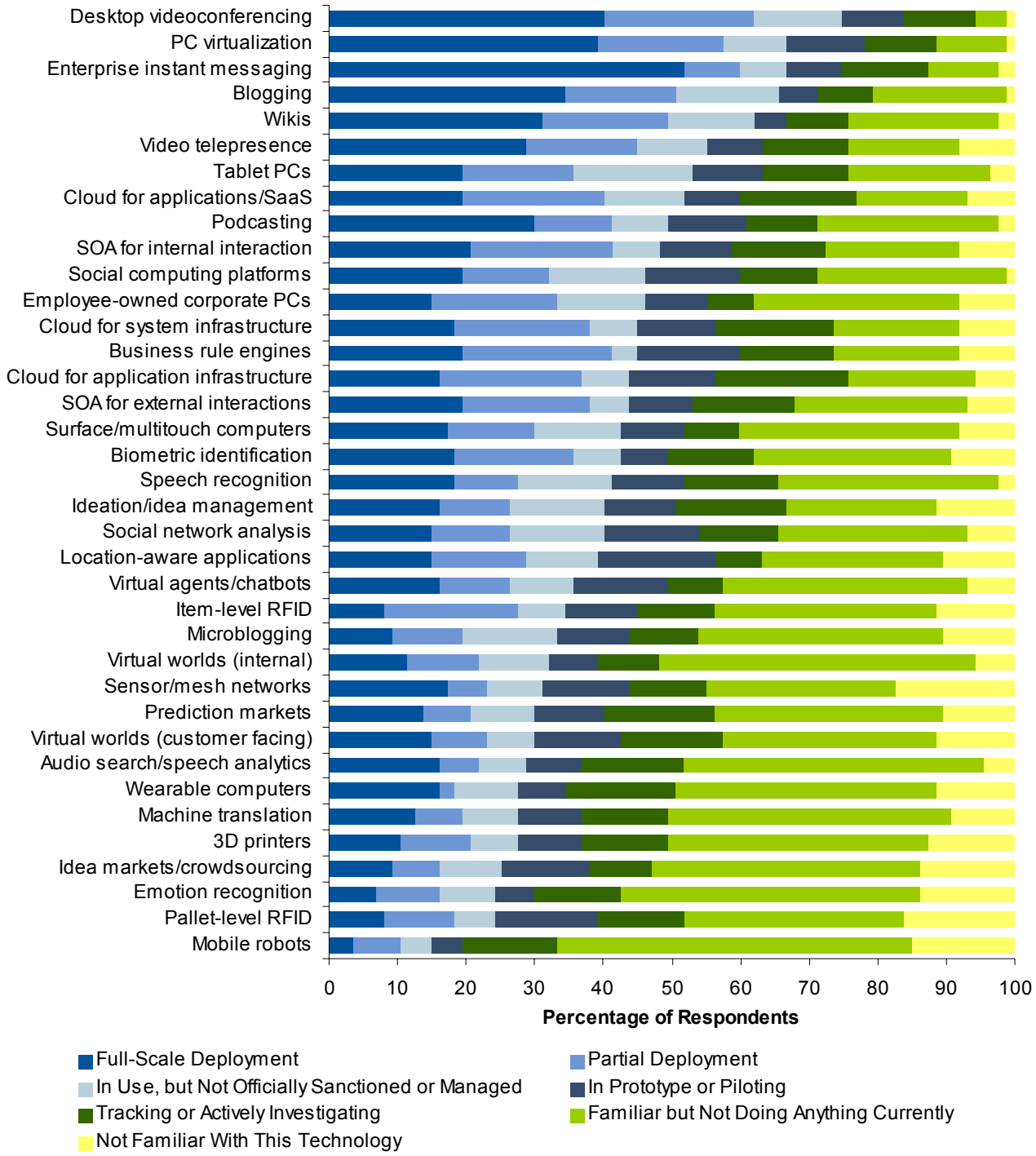
Figure 8. Technology Adoption by All Respondents



Source: Gartner (November 2008)

Gartner

Figure 9. Technology Adoption by Type A (Aggressive) Organizations



Source: Gartner (November 2008)

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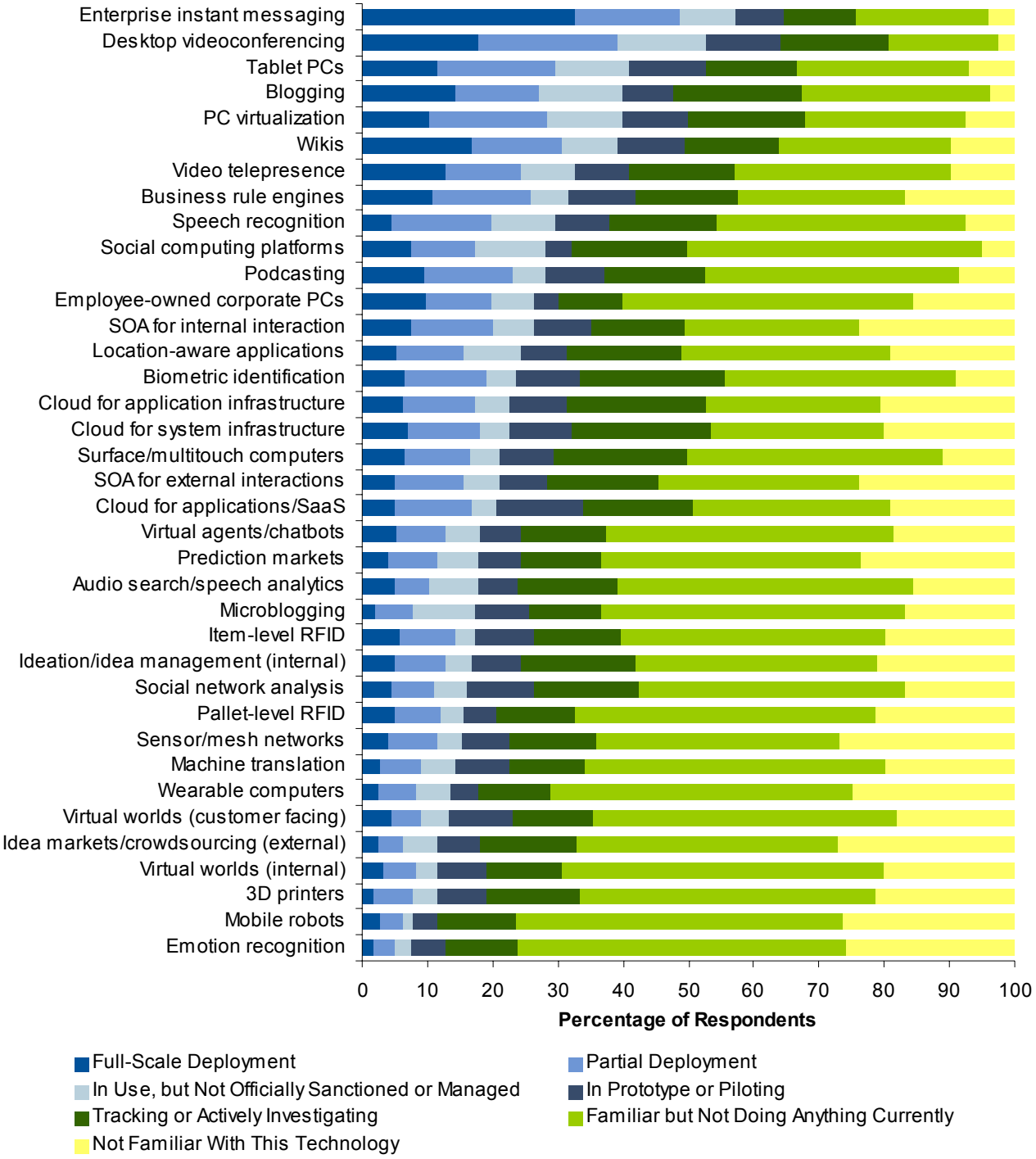
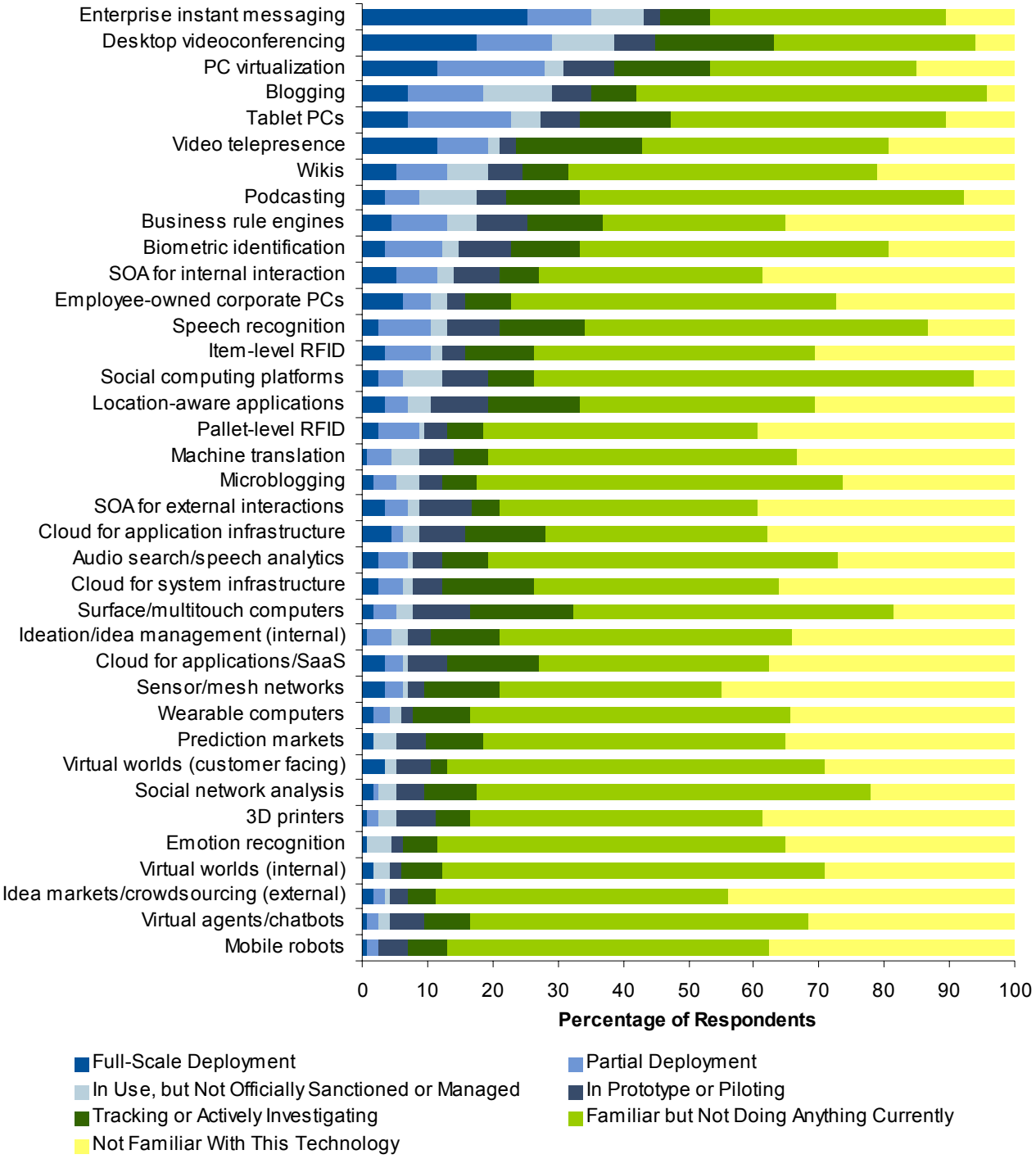
Figure 10. Technology Adoption by Type B (Mainstream) Organizations



Source: Gartner (November 2008)

Gartner

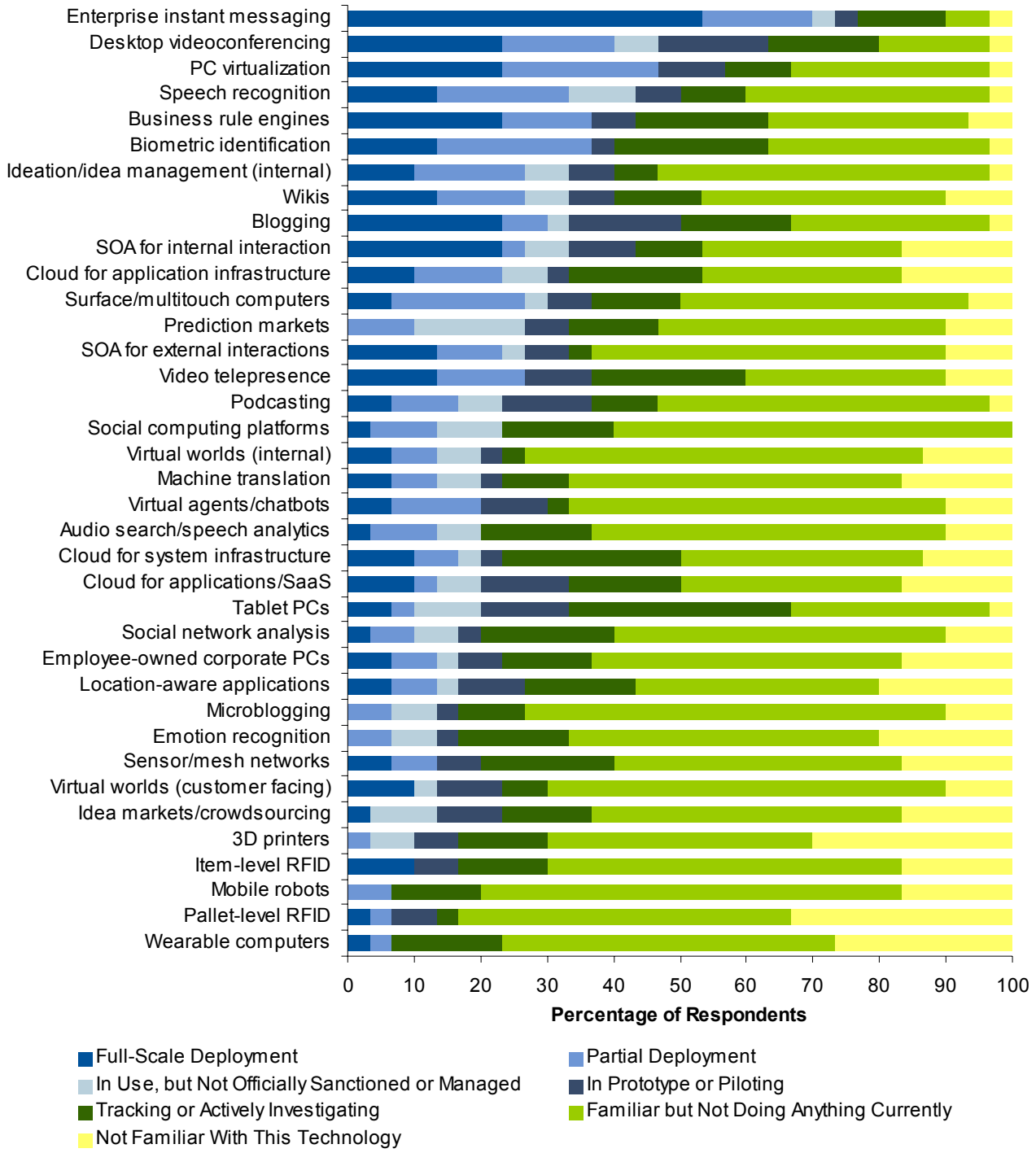
Figure 11. Technology Adoption by Type C (Conservative) Organizations



Source: Gartner (November 2008)

Gartner

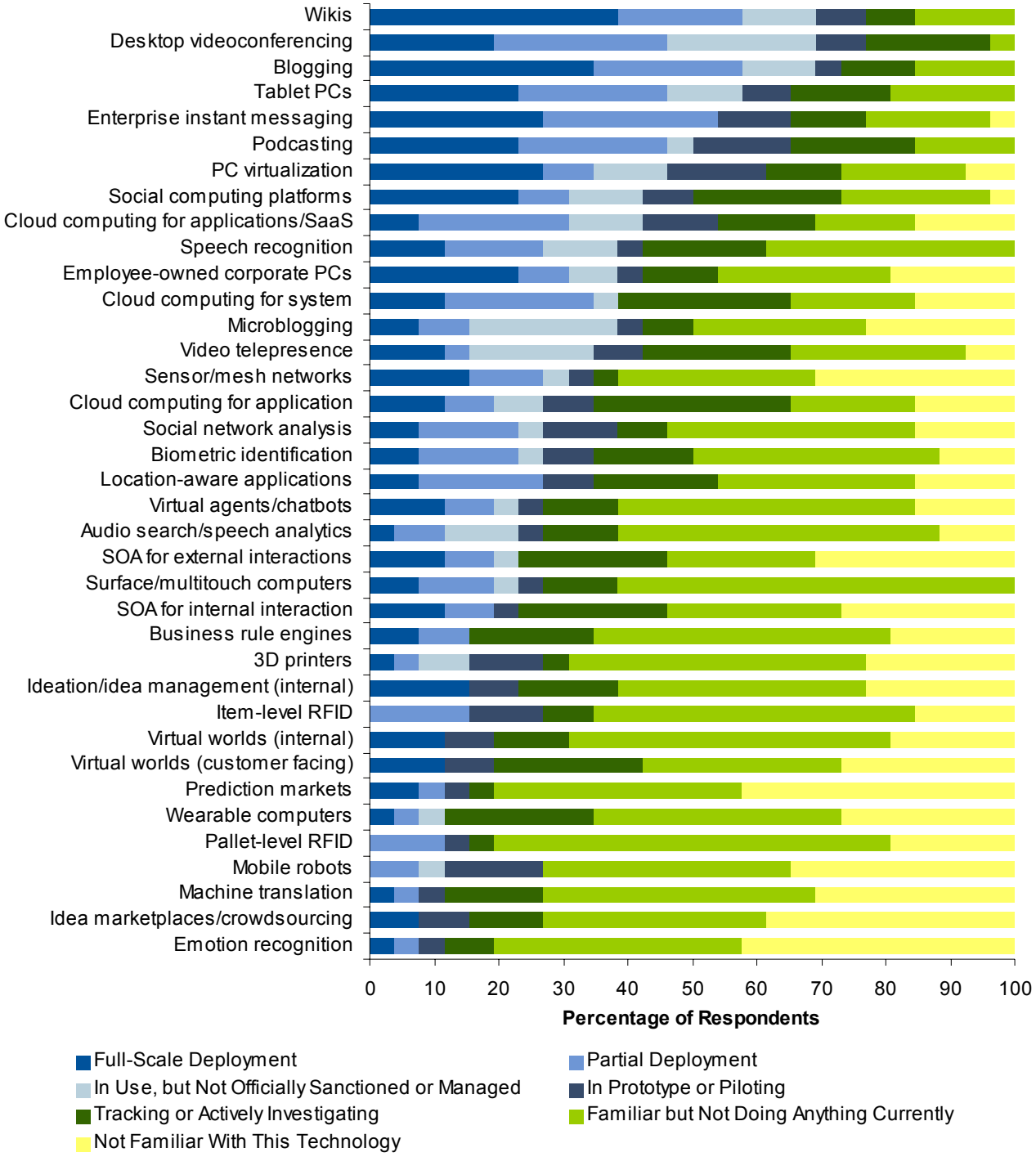
Figure 12. Technology Adoption by Banking



Source: Gartner (November 2008)

Gartner

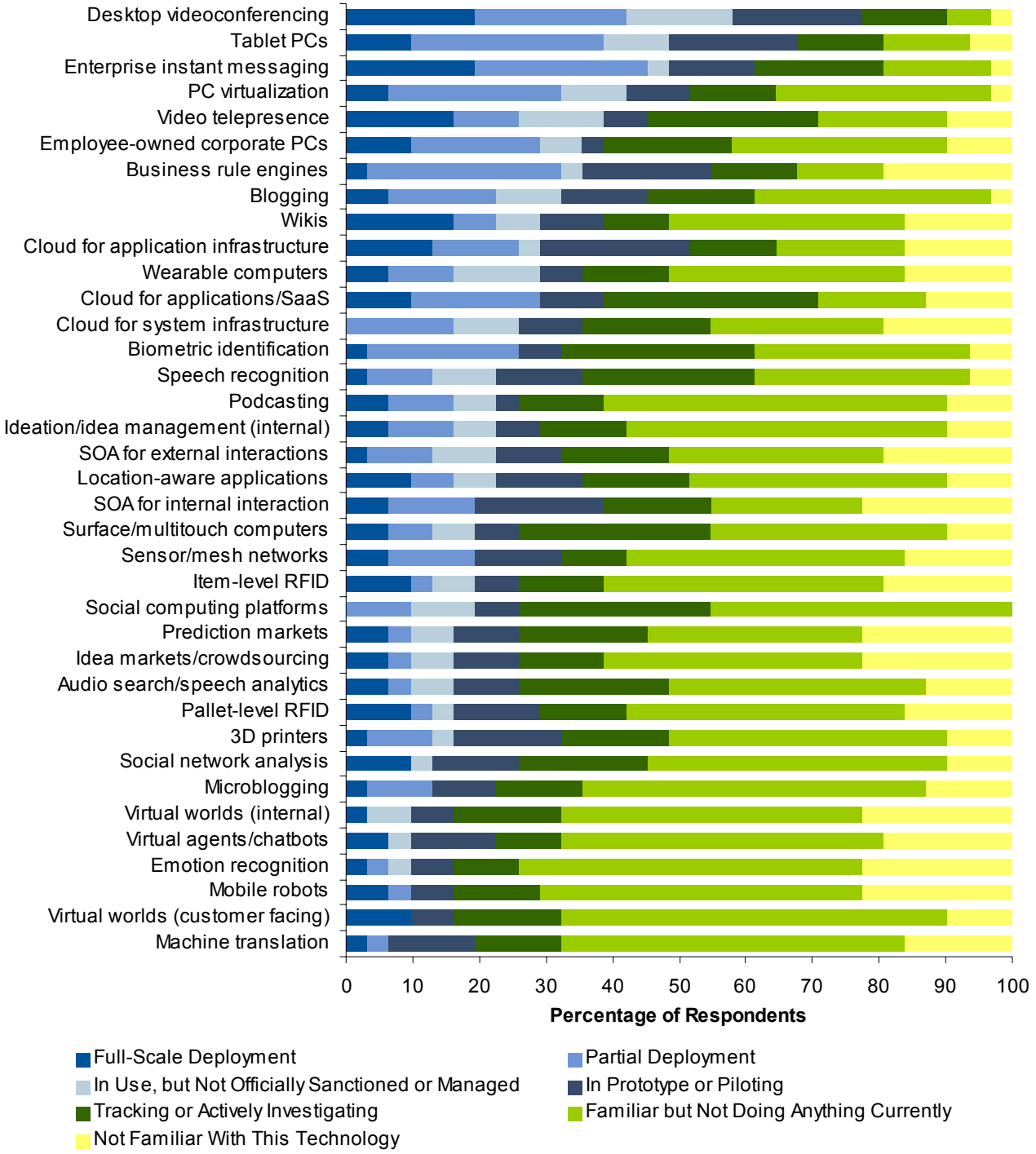
Figure 13. Technology Adoption by Education



Source: Gartner (November 2008)

Gartner

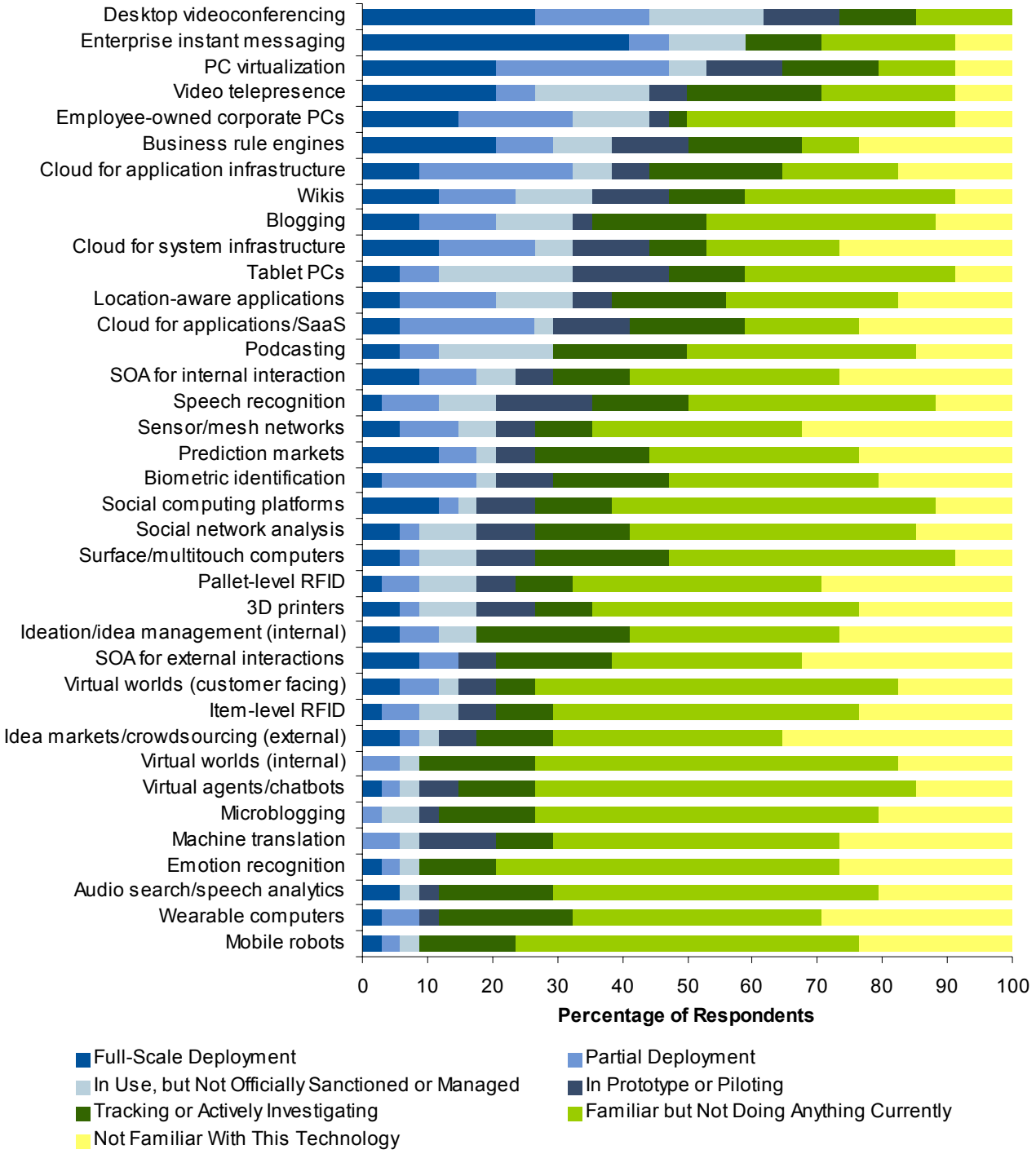
Figure 14. Technology Adoption by Energy and Utilities



Source: Gartner (November 2008)

Gartner

Figure 15. Technology Adoption by Financial Services



Source: Gartner (November 2008)

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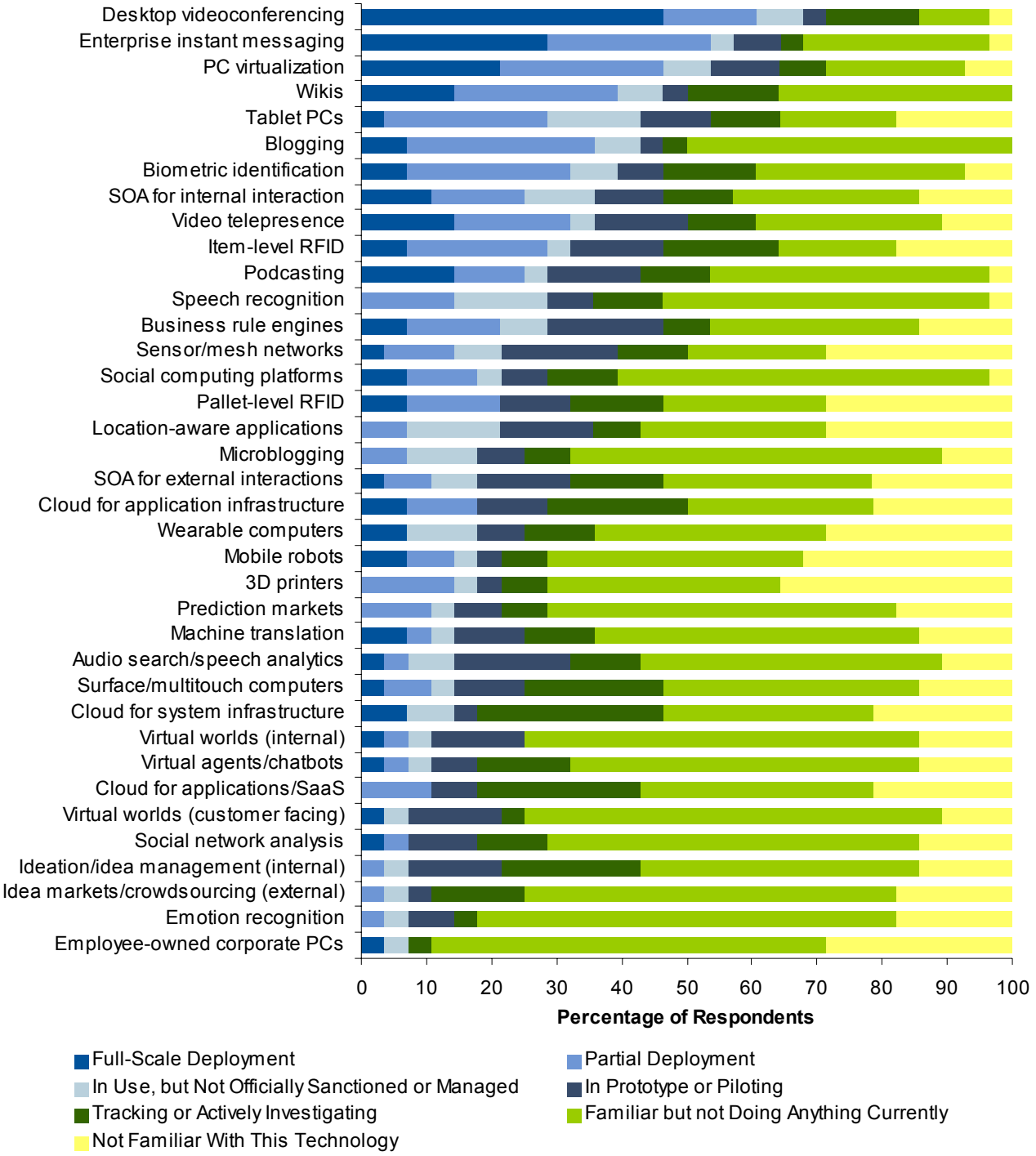
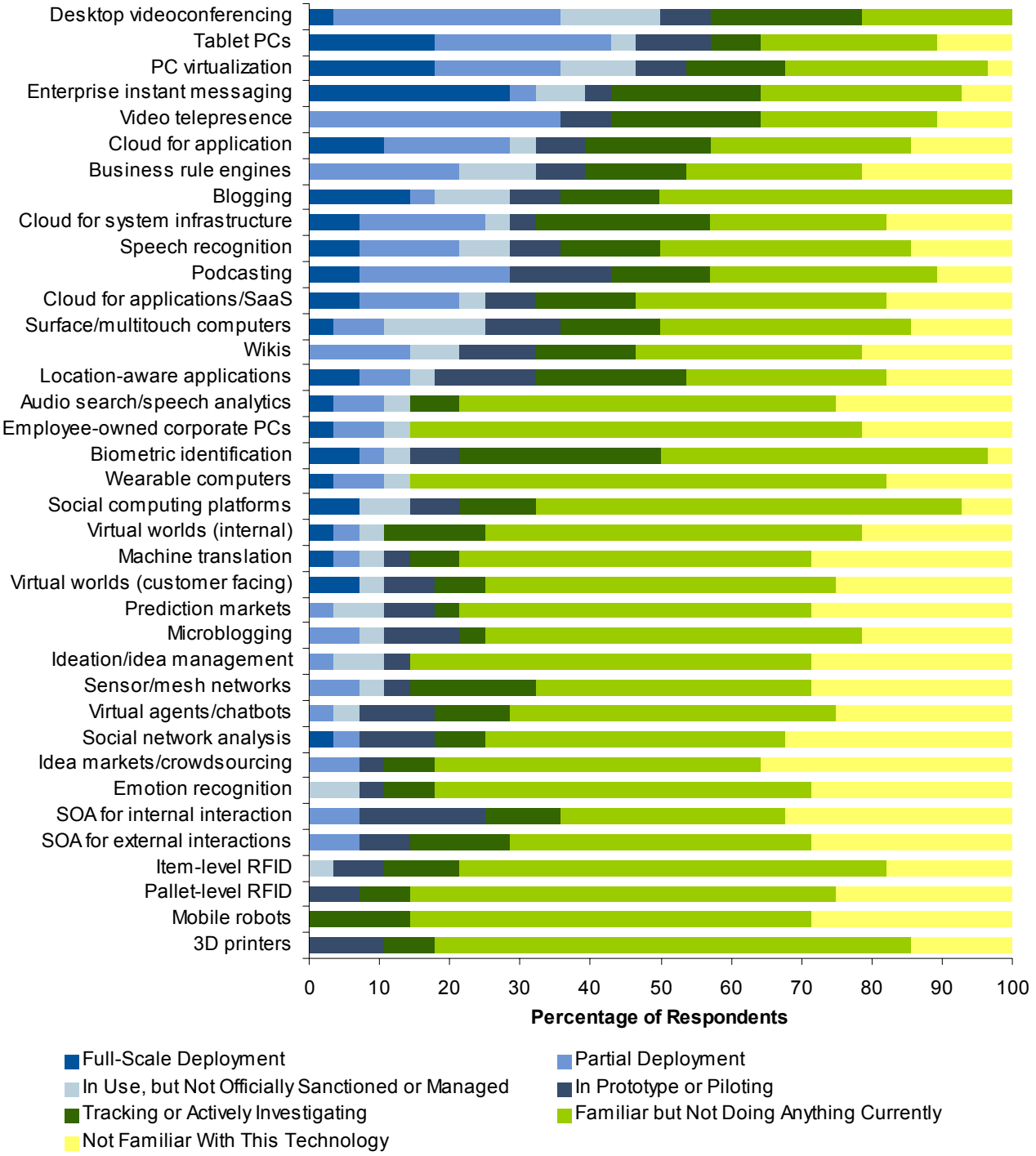
Figure 16. Technology Adoption by Federal and National Government



Source: Gartner (November 2008)

Gartner

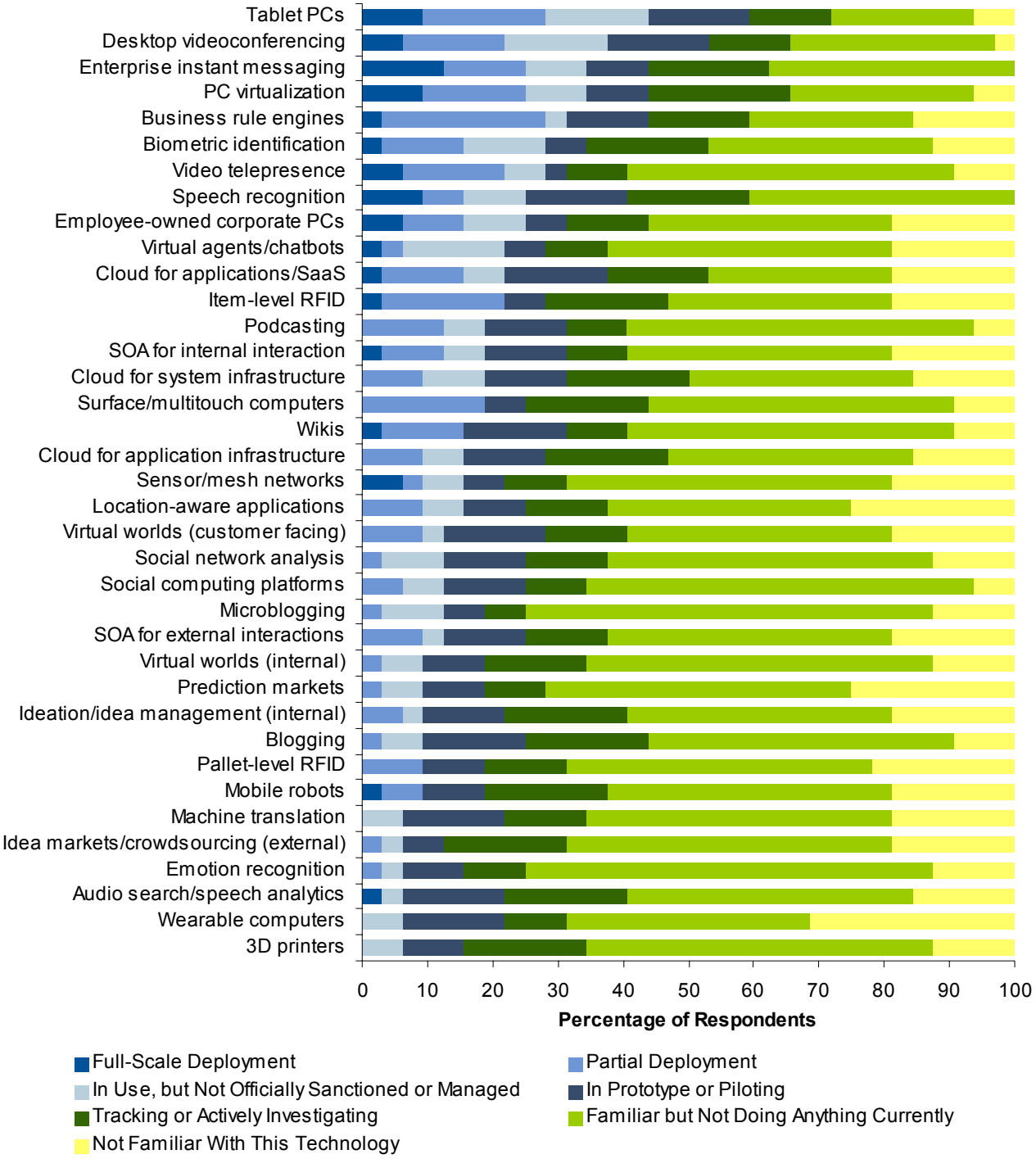
Figure 17. Technology Adoption by Local and State Government



Source: Gartner (November 2008)

Gartner

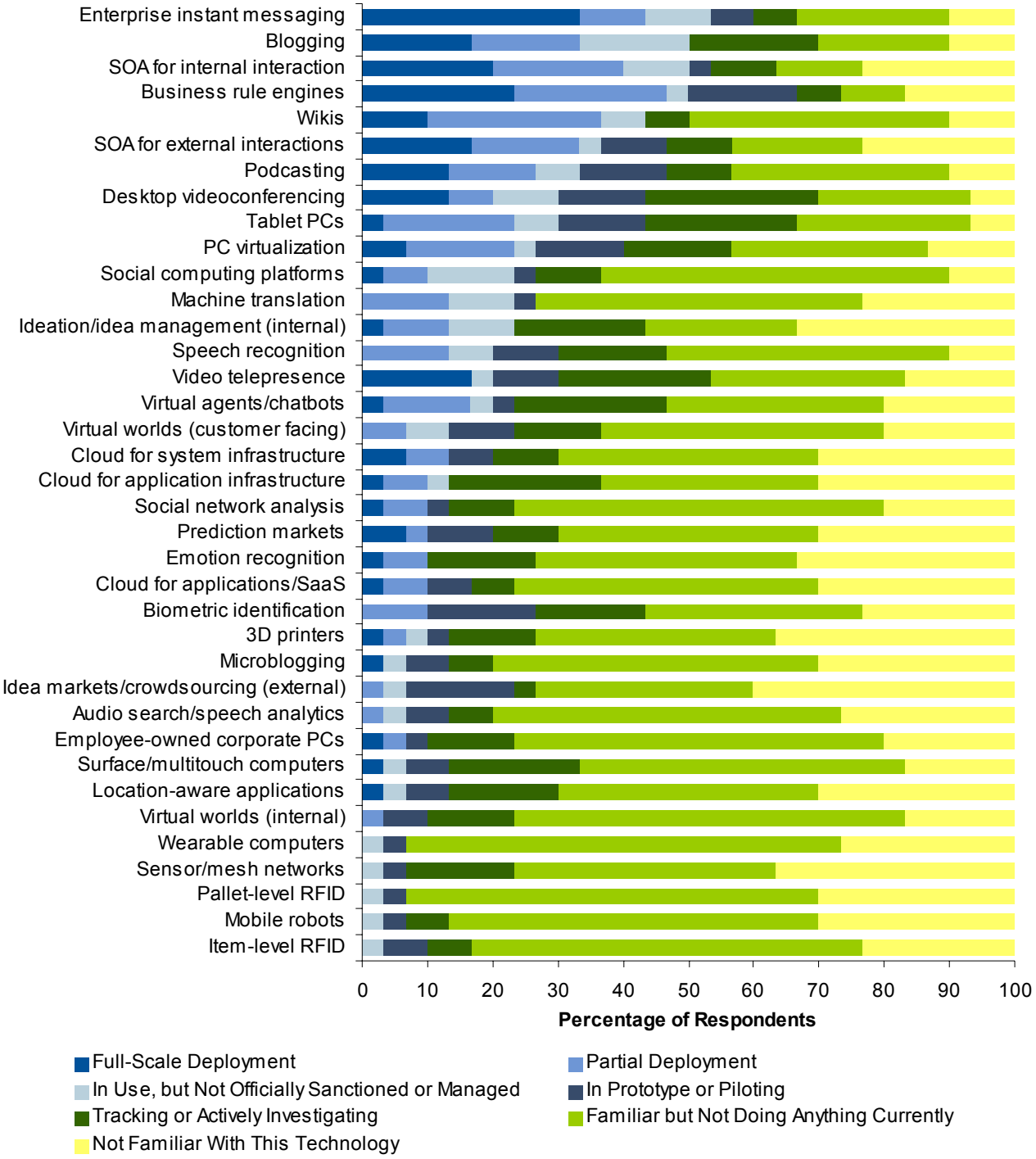
Figure 18. Technology Adoption by Healthcare Providers



Source: Gartner (November 2008)

Gartner

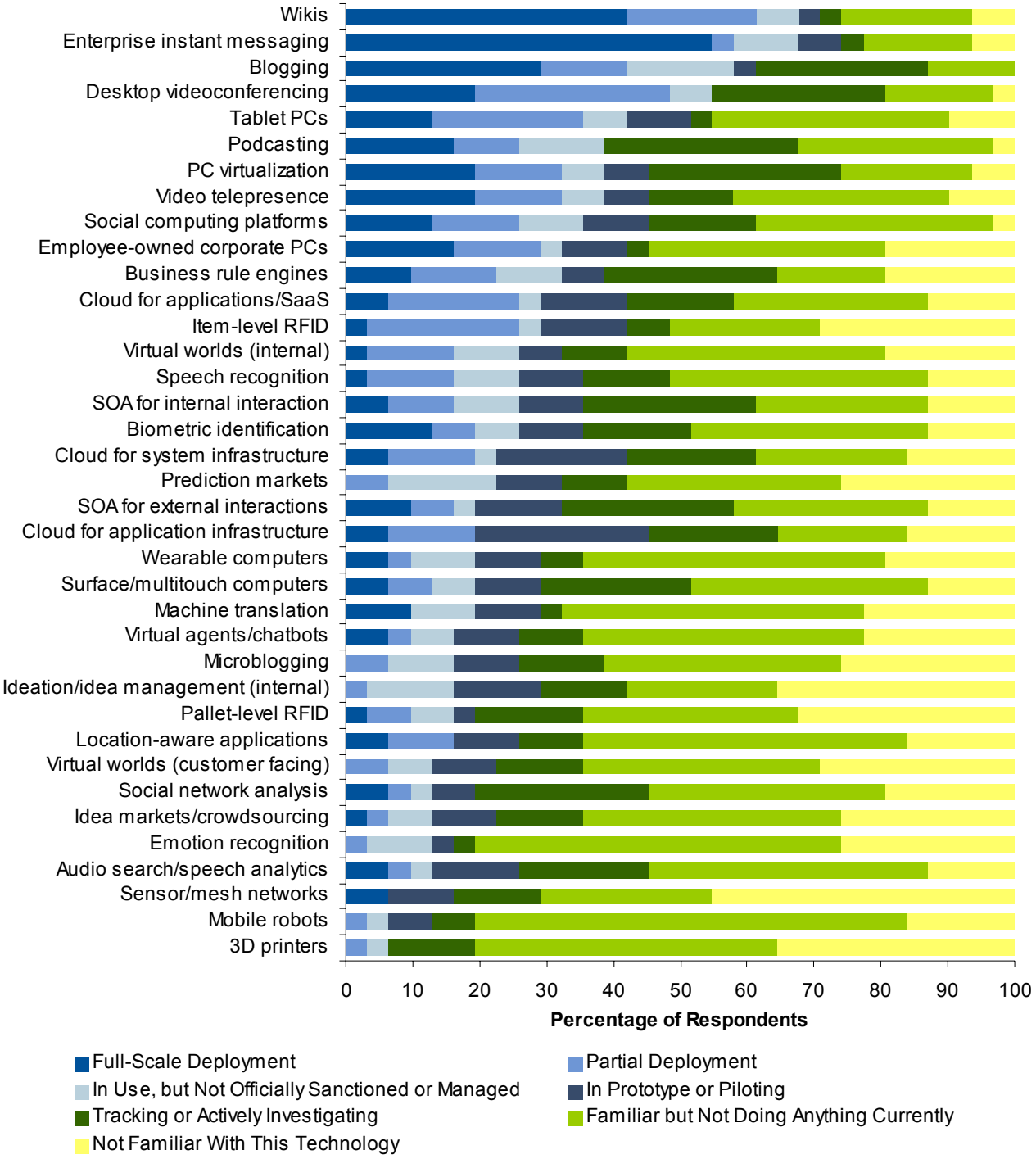
Figure 19. Technology Adoption by Insurance



Source: Gartner (November 2008)

Gartner

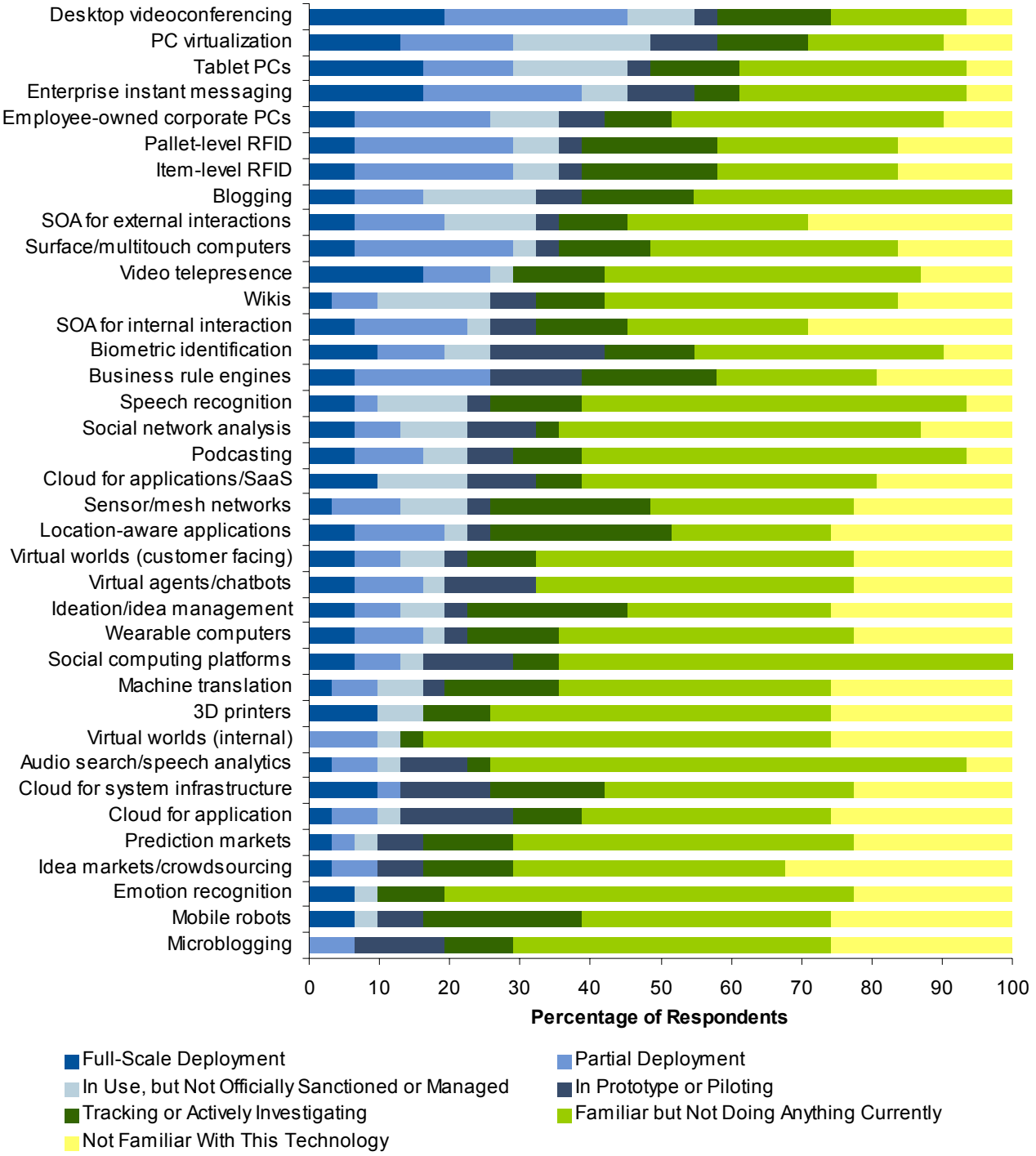
Figure 20. Technology Adoption by IT Services



Source: Gartner (November 2008)

Gartner

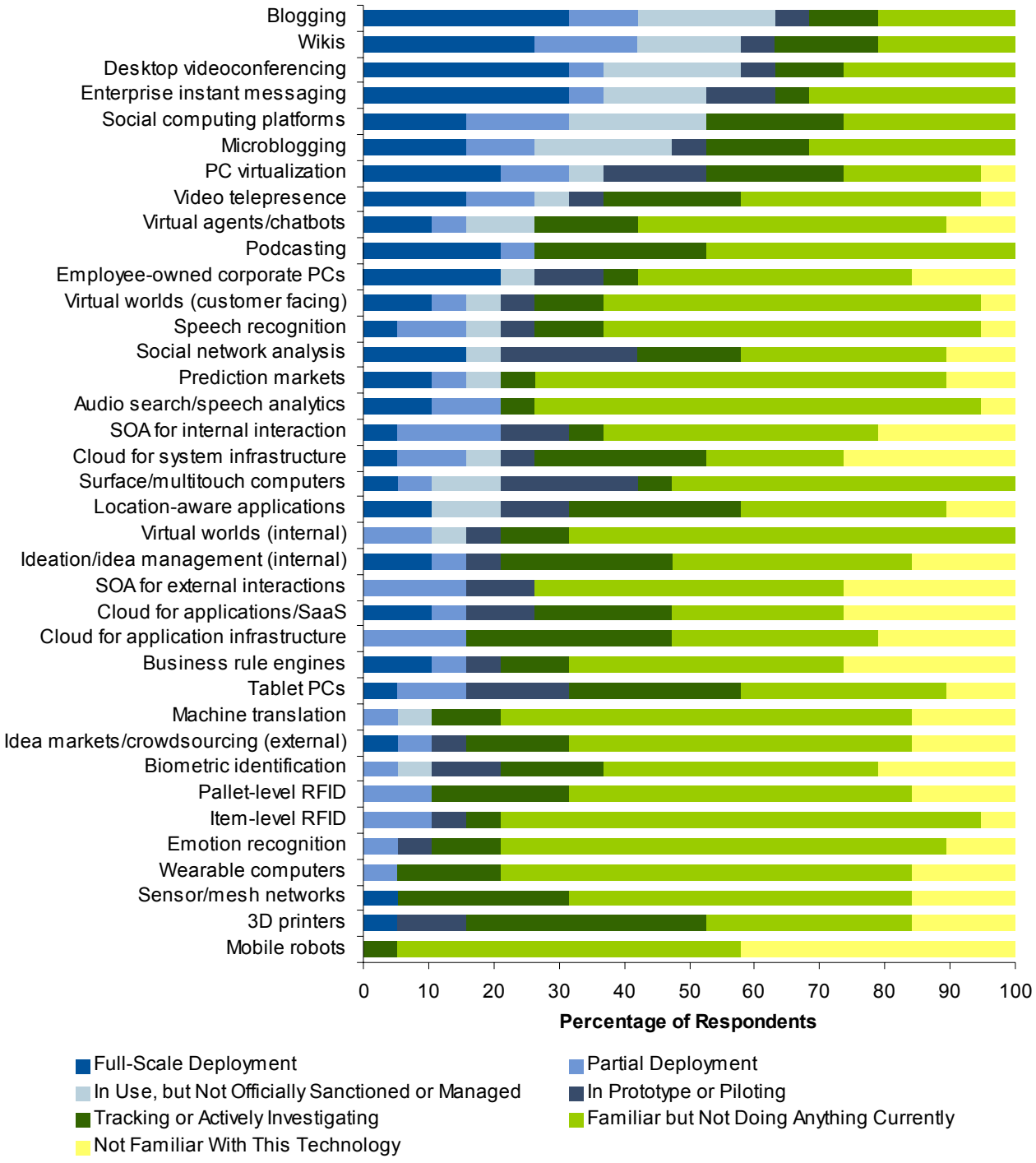
Figure 21. Technology Adoption by Manufacturing



Source: Gartner (November 2008)

Gartner

Figure 22. Technology Adoption by Media



Source: Gartner (November 2008)

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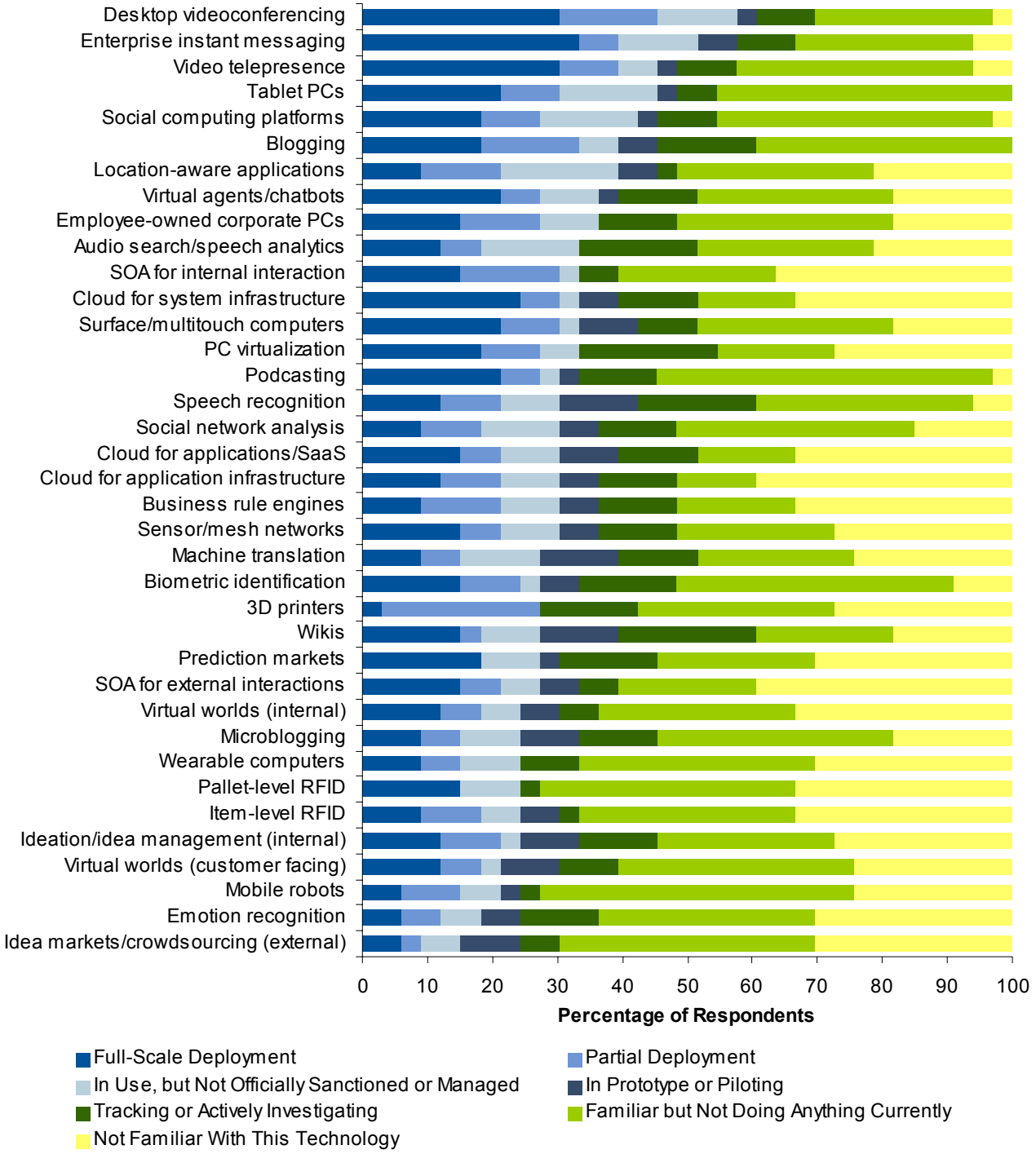
Figure 23. Technology Adoption by Services



Source: Gartner (November 2008)

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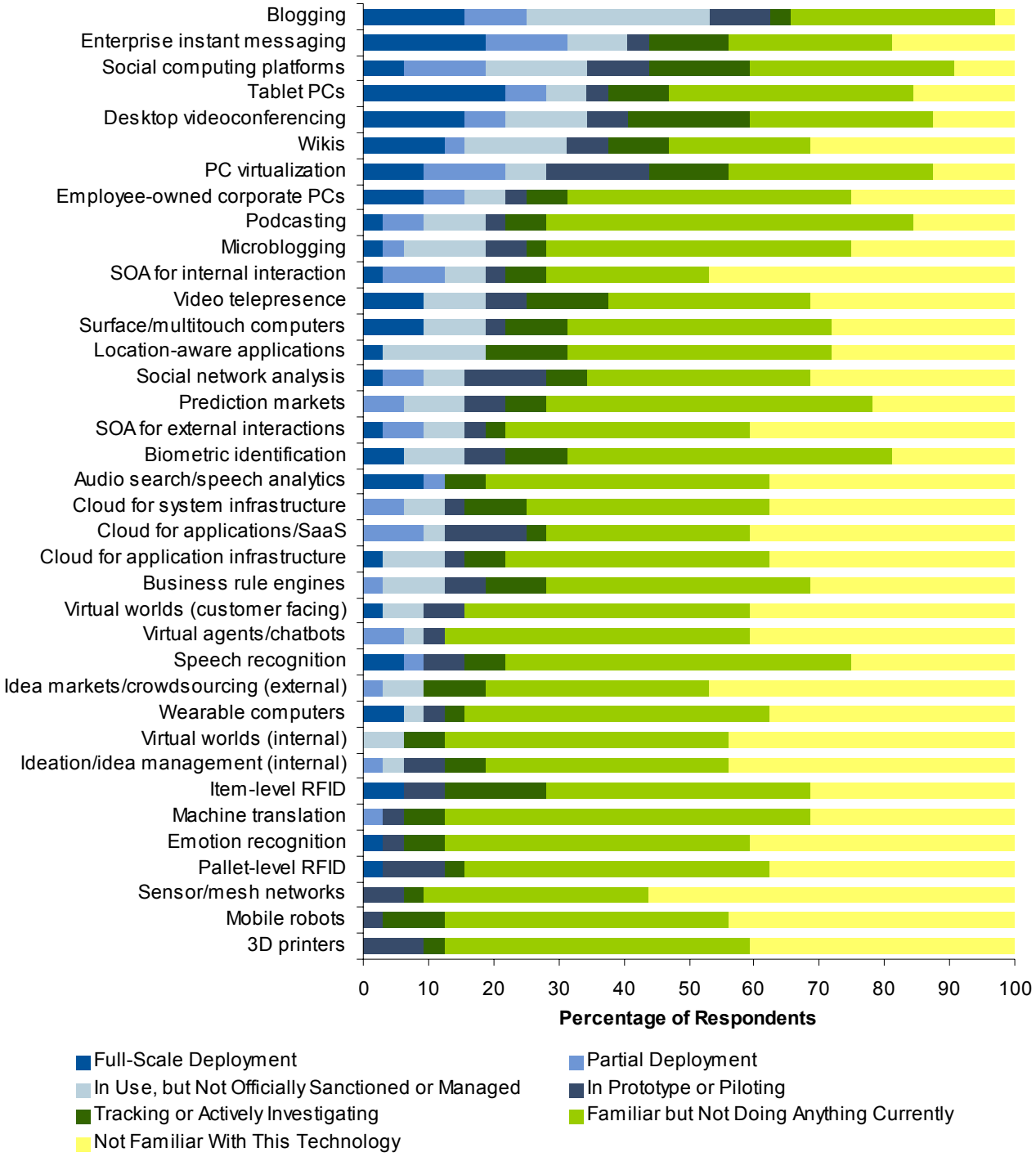
Figure 24. Technology Adoption by Retail



Source: Gartner (November 2008)

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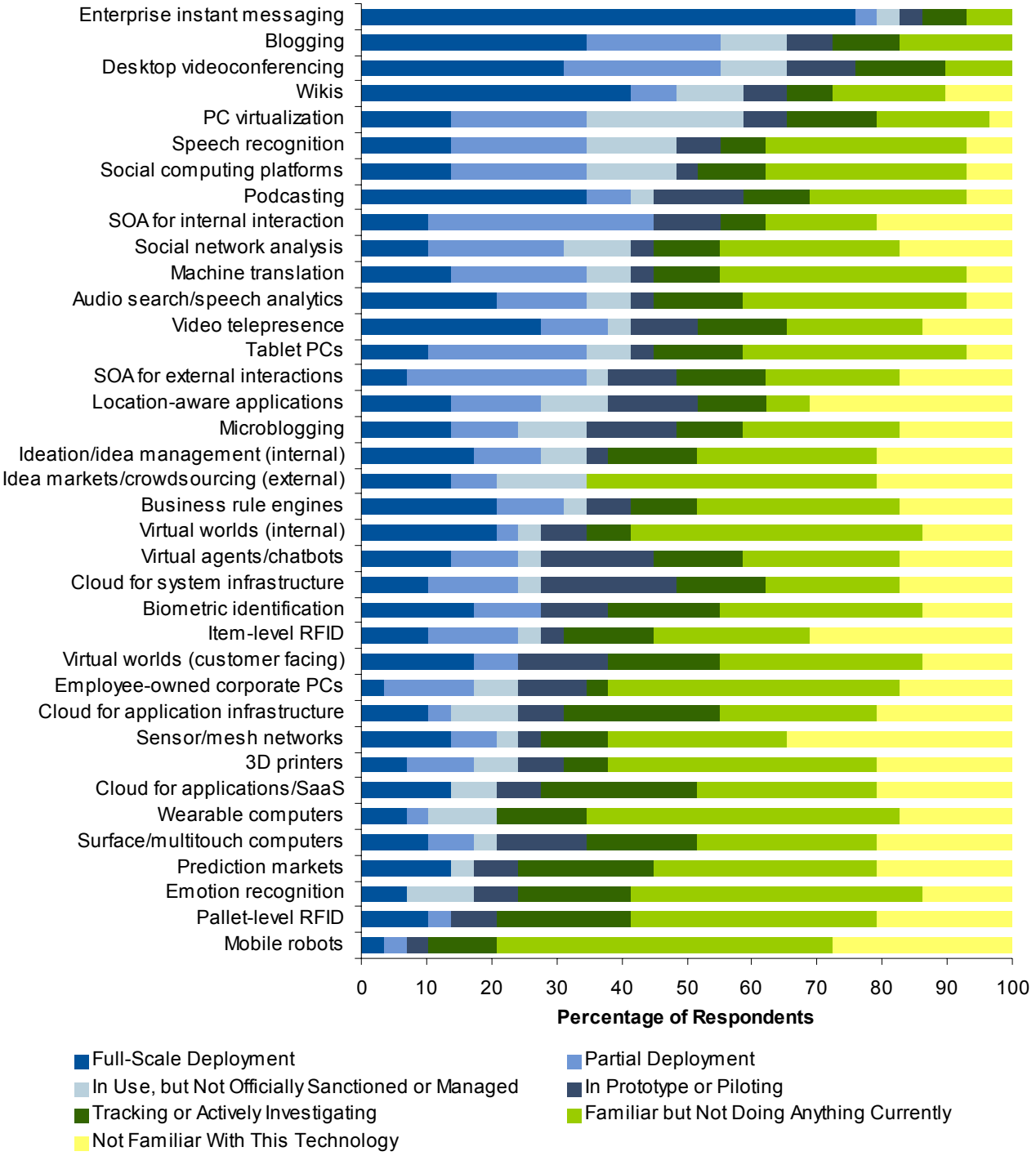
Figure 25. Technology Adoption by Telecommunications



Source: Gartner (November 2008)

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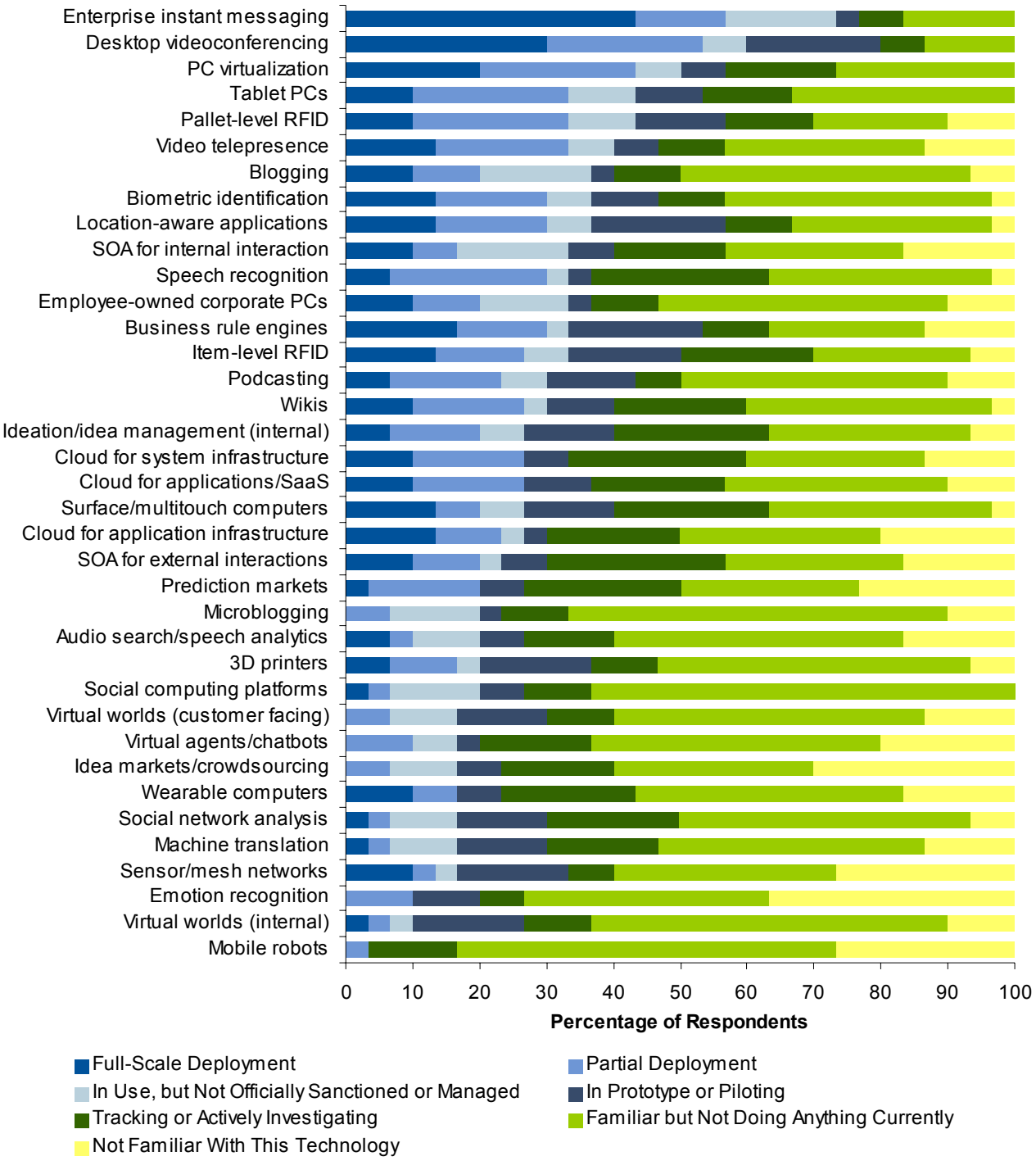
Figure 26. Technology Adoption by Transportation



Source: Gartner (November 2008)

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