

CHAPTER 1

LONGITUDINAL TRENDS IN THE UNITED STATES — RESULTS OF THE BIT SURVEY OVER THREE YEARS

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Summary

The UCLA Business and Information Technologies (BIT) Survey is aimed at understanding and tracking the impacts of technologies on business practices. This report shows the longitudinal trends observed by comparing the findings from three surveys conducted in the United States in 2003–2004, 2004–2005, and 2005–2006.

The subject group of each year's survey consisted of entities that could make technology management-related decisions (acquisition, implementation, and maintenance) independently. The survey was sent to Chief Information Officers (CIOs) and other senior officers; these officers were deemed to be the individuals most likely to be able to respond to the business and technology issues in the survey.

The survey addressed the following issues:

- Technology Adoption
- Internal Organization
- Forward-facing Relationships
- Backward-facing Relationships
- Business Results
- Outsourcing and Offshoring
- Globalization

Key longitudinal trends are listed below:

- Web and e-commerce, wireless hardware and software, security technologies (surveillance, third-party authentication, identity management solutions, biometrics and Radio Frequency Identification (RFID)), collaboration tools, networked storage, enterprise resource planning (ERP), and business intelligence all saw strong increases in their adoption over the three-year period in the United States, with web and wireless technologies reaching close to 90% adoption rates.
- A time lag was observed between the hype and the actual adoption of a technology, as in the case of identity management solutions, RFID, and biometrics. Information and communication technologies (ICT) that were planned for the near

future saw an increase in their adoption in the next year, a fact that added to the validity of the survey.

- The internal organization changed in terms of its workforce with ICT adoption. Data from the survey supported this trend, namely that the following categories tended to increase over the three-year period of the survey: demand for intelligent systems by executives, telecommuting, teleconferencing, workers needing to retrain constantly, IT functions shifting from staff to line, and collaboration among workers.
- Support for collaboration was observed in the longitudinal trends. The increasing use of collaboration tools as well as the strong increase in collaboration among workers especially in the third year survey support increasing collaboration with the adoption of ICT.
- The internal organization also changed in terms of its structure. Organizations were becoming virtual and heterarchical. In addition, customer-interacting transactions were being monitored increasingly, and automated monitoring of productivity was increasing. However, incentives were not yet based on monitoring of productivity.
- Companies rarely outsourced, and offshoring/BPO was lowest on the list of company budgets for all the three years. This latter statistic was surprising given the hype for and backlash on BPO a few years ago. One possibility for this low number is that companies did not accurately report on the extent of their BPO budgets for fear of backlash; another reason could be that the lag phenomenon observed for technology adoption may also exist for BPO but may be more drawn out than was observed for technologies. The type of companies that were part of the sample may have also played a role.
- Among forward-facing or customer-interacting functions, content management of websites and marketing became increasingly automated over the survey's three-year period.
- Among backward-facing or partner interacting functions, Electronic Data Interchange (EDI), e-payment, and e-procurement saw increasing adoption trends. However, the future or planned adoption for EDI experienced a decreasing trend, as did the adoption of e-payment. The planned adoption of XML continued to show increases.
- Geographic reach was affected by proximity, language, cultural similarities, and cost.

1.1. Introduction

The Business and Information Technologies (BIT) project, led by the UCLA Anderson School of Management, was created to study changes in global trade and competition, economies, national policy, industry sectors, firms, and individual jobs and functions. The study attempted to measure both far-reaching, broad changes as well as deep changes happening at multiple levels of economic and business activities; these activities ranged from global and national to sectors, firms, functions, and jobs. These changes were captured: (i) by using a survey that captured broad firm-level impacts across all sectors, (ii) by analyzing GNP data to understand impacts at the

level of the economy, and (iii) by conducting case studies to understand in-depth impacts at the level of a specific sector or technology.

This study aimed to capture broad and high-level impacts of ICT adoption to understand the changes happening at the level of the firm and the individual. The methodology used was a survey of CIOs and other senior officers who were heading a sub-organization or organization that was able to make technology management decisions (and investments) independently and that had its own profit and loss responsibility. The survey was sent to about 20,000 CIOs and other senior officers across all sectors and firm sizes (measured by number of employees as well as revenues) within the United States. The mailing list was acquired from an independent organization that collects corporate data. Respondents received the surveys by mail. They were given the options of taking the survey online using a link provided or completing and returning the survey by mail.

The reason for using such a survey was to get a high-level perspective from as many corporations as possible. Survey data breakdowns are given in Appendix A.

Three surveys have been conducted in the United States. The first survey was conducted in 2003–2004 to establish a baseline. Highlights of the baseline survey were as follows:

- The internal organization had been significantly impacted by ICT adoption. Workforce (at the level of the individual) and organizational structures (at the level of the firm) had changed.
- Certain technologies and capabilities had been very widely adopted; web and e-commerce for internal and external communications were the most widespread.
- The adoption of hardware-based technologies such as biometry and RFID appeared to be slower than software- and communication-based technologies.
- ICT adoption had not yet had a major impact on marketing strategy. In particular, there had not been a significant change in branding or positioning (across all respondents). However, there was a move towards customers performing more self-service tasks while purchasing online.
- The degree to which outsourcing and offshoring were being pursued was quite limited.

A second survey was conducted in 2004–2005 (Karmarkar and Mangal, 2007). Although the same questionnaire was used, this survey was sent out to a different random sample across the United States. The survey was repeated for a third time in 2005–2006.

Using the findings from all three surveys, longitudinal trends are determined in the United States over the three survey periods. The sample from each survey period contained about 250 respondents (249 in 2003–2004, 248 in 2004–2005, and 210

in 2005–2006). The respondents were different each year, as the surveys were sent out to a random sample from a database of CIOs and other senior officers throughout the United States. This was done because of the high turnover rate found among officers at these executive levels and the difficulty of tracking them once they moved. Even if an officer could be tracked, the set of responses from the officer would become different for the new company and hence would not be comparable. Due to the above reason, exact comparability of the three samples cannot be done.

The survey was categorized into seven categories. Major issues in each category are discussed below.

1. **ICT Adoption and Budget Trends** — This category aimed to capture which ICTs had been adopted by organizations at the time of the survey, the ICTs that had not been adopted at the time of the survey but were planned for adoption in the near future, and the ICTs an organization was not planning to adopt in the near future. Some questions this section of the survey addressed included the following: Were the hardware-related phenomenon such as outplacement of the box, net-based computing, and return of the dumb terminal becoming more popular? Were browser interfaces replacing operating systems? Was in-house processing power declining? Were the software-related phenomena becoming more prevalent: outplacement of packages, use of Application Service Providers (ASP's), third-party dedicated operations? Were tasks that were traditionally performed by employees becoming more self-service oriented?

This category also looked at the budgets being allotted to various software applications and processes.

2. **Internal Organization** — This category studied whether ICT adoption was changing organizational structures. Were phenomena such as deconstruction of the firm (in terms of its hierarchical structure, resulting in fewer levels of control), heterarchies, nontraditional organizational forms, and process-centered organizations occurring? Was the firm also becoming less centralized physically, resulting in telecommuting, teleconferencing, and geographical dispersion? Were organizational boundaries and formal inter-firm processes being eliminated with the use of ICT technologies such as XML?

Changes to the internal organization in terms of the workforce were also studied in this category. Factors such as substitution of information and knowledge work by software that resulted in the reduction of employment are studied. The following questions were also included in the survey. Was ICT knowledge increasing in senior staff (measured by looking at the proportion of executives who were tech savvy)? Was screen time, in terms of the proportion of employees facing a screen, changing? Was ICT function shifting from staff to line? Was the CIO's role requiring greater involvement in marketing and sales?

3. Forward-facing Relationships — This category aimed to capture impacts of ICT adoption on all customer-facing interactions. Were customer relationships through on-line contact (measured by multiple touch points and frequency of touches) increasing? Was the organization's face changing in terms of brand adaptation, site creation, and expenditures? Was the company getting a new transactions face, with volume of purchasing and volume of sales performed online increasing?
4. Backward-facing Relationships — Impacts of ICT adoption on partner relationship activities were studied in this category. Were interactions with partners using ICT increasing? Were ICT-based purchasing mechanisms becoming more accepted?
5. Business Results — In this category, impacts of ICT adoption on firms' business results were studied. Were costs for Human Resources (HR), technology, and customer service decreasing or increasing with ICT? Were companies benefiting in strategic areas (such as better understanding of their customers and of their competitors' products and services) with ICT use?
6. Outsourcing and Offshoring — Impacts of ICT adoption on outsourcing and offshoring in a firm were studied in this category. Was there an increase in BPO/offshoring? Was the hiring of temporary staff becoming more prevalent? Were IT tasks more likely to be outsourced or offshored compared to nonIT functions?
7. Globalization — This category looked at the impact of ICT adoption on globalization and geographic reach of the firm. Were firms setting up markets and using providers in regions other than where they were based? Was global reach increasing in terms of distance to suppliers and vendors, service regions, and trade? With globalization becoming more prevalent due to standardization and ICT adoption, were certain regions preferred due to proximity, language, culture, or economics?

Data for the three-year surveys was compiled and analyzed. Findings looking at various issues in each category are discussed in the rest of this Chapter.

1.2. Findings

Longitudinal comparisons drawn from three years of survey data are discussed below.

1.2.1. *ICT adoption and budget trends*

Nineteen new and highly hyped technologies were listed in a matrix and survey respondents were asked whether they currently used the technology, did not currently use the technology but planned to use it in the next three years, did not plan to adopt

it over the next three years, or believed that the technology was not applicable to their organization. The percentage of firms that had adopted each of these technologies at the time of the survey is shown in Fig. 1.1. This factor was used to determine trends in technology adoption.

Figure 1.2 shows the trends for technologies that had not yet been adopted the technology but that firms were planning on adopting in the short term.

As seen from Fig. 1.1, adoption for web and e-commerce technologies was 85%, 84%, and 84% in years 1, 2, and 3, respectively. Both the high and stable adoption rate over the three-year period could be indicative of nearly complete adoption of web and e-commerce by companies in the United States and supported by the low levels (less than 10%) of web and e-commerce adoption planned for the future, as seen in Fig. 1.2.

Another technology whose adoption was high in the United States at the time of the survey was wireless hardware and software. The first time the survey was

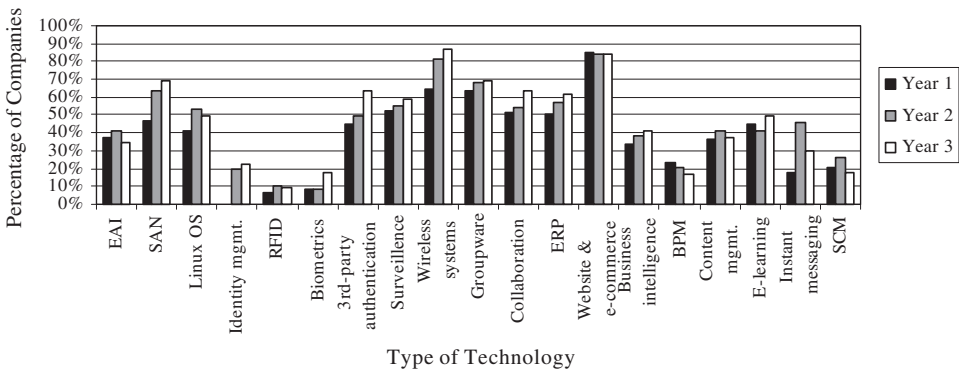


Fig. 1.1. Percentage of companies that had various technologies at the time of the survey.

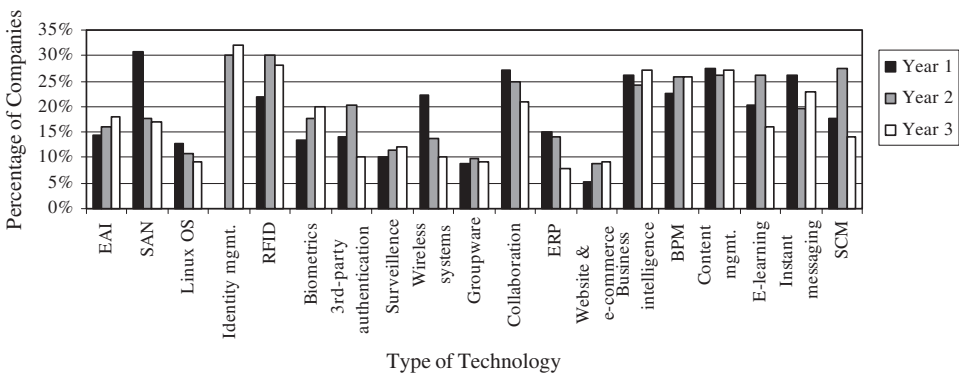


Fig. 1.2. Percentage of companies that planned to adopt various technologies.

conducted in the United States, it was observed that 65% of the respondents had adopted wireless hardware and software (Fig. 1.1) and 22% planned to do so in the near future (Fig. 1.2). Year 2 data showed that 81% of the firms had adopted wireless technologies. This number went up to 87% in year 3. In addition, as can be seen from Fig. 1.2, the number of companies that planned to adopt wireless technologies was 14% and 10% in years 2 and 3, respectively. The decrease in the planned adoption of wireless technologies indicates that, like web and e-commerce, wireless technologies have also been adopted by nearly every firm in the United States. The fact that trends predicted in one year were realized in the next year adds to the validity of the findings.

Security was a third trend that saw increasing adoption over the survey period. This increase was observed in the various technologies in the survey that related to security, including surveillance, third-party authentication, identity management solutions, biometrics, and RFID. (It is an ICT that offers greater visibility into processes, thereby improving tracking and hence security). Adoption of ICTs for surveillance, third-party authentication, identity management solutions (data available for years 2 and 3 only), and biometrics increased over the three years, as seen from Fig. 1.1. RFID adoption went up from year 1 (7%) to year 2 (10%) but decreased slightly in year 3 (9%).

Another technology that saw increased adoption was collaboration tools, whose adoption over the three-year survey period increased from 51% in year 1 to 54% in year 2 and 64% in year 3. An increasing trend was also observed for the following technologies: networked storage (47%, 64%, and 69% in years 1, 2, and 3, respectively), ERP (50%, 57%, and 62% in years 1, 2, and 3, respectively), and business intelligence (34%, 38%, and 41% in years 1, 2, and 3, respectively). Business process modeling was the only technology that saw a decreasing trend (24%, 21%, and 17% in years 1, 2, and 3, respectively). These data are shown in Fig. 1.1.

It should be noted that the survey only asked whether organizations had adopted these technologies; the extent to which each technology had permeated the organizations was not captured.

Of the technologies planned for adoption (shown in Fig. 1.2), biometrics and surveillance tools were some of the most popular, pointing to the continuing importance of security in organizations. RFID was also planned for adoption in a large percentage of companies, although this percentage went down from year 2 to year 3 (22% in year 1 to 30% in year 2 to 28% in year 3). The planned future adoption of other technologies is also going down. These include networked storage, Linux operating system, and ERP. These are the three technologies that are observed to undergo a reduction and stabilization in the future plans of organizations for adopting these technologies. The usage of collaboration and portal tools also went down although the percentage of companies that were planning to adopt these tools was still relatively high (over 20%).

Overall, for technology adoption, a lag was observed between the time that hype was seen for a technology and the time at which that technology was actually adopted by various companies. The adoption patterns of biometrics, identity management solutions, and RFID demonstrated this phenomenon. In year 1, biometrics was adopted by only 9% of the organizations, although 13% planned to adopt the technology in the future. The next year, still 9% of the firms had adopted this technology, but 18% now planned to adopt. Then, by the third year of the survey, 18% of the firms had adopted biometrics, although hype for this technology had already started at the time the first survey was carried out. The adoption patterns for RFID were similar with 7% and 22% adopted and planned to adopt 10% in year 1 and 30% in year 2, and 9% and 28% in year 3, indicating that, although hype for RFID technology had started by the time the survey was first carried out, the technology was still more on the planned list for many more organizations than actually adopted the technology. Identity management data was available only for years 2 and 3, but these findings also indicated similar support to the time lag phenomenon. Of the companies surveyed, 20% had adopted identity management solutions in year 2, while 30% planned to adopt them. In year 3, 22% had adopted and 33% planned to adopt. These trends are shown in Figs. 1.1 and 1.2.

The survey also looked at the budget trends for various technology-related applications and processes (Fig. 1.3). Firms reported increasing or significantly increasing budgets for security, measured by hardware (63%, 67%, and 69% in years 1, 2, and 3 respectively), software (65%, 76%, and 69% in years 1, 2, and 3, respectively), and disaster recovery/business continuity (47%, 57%, and 59% in years 1, 2, and 3, respectively). Networked storage budgets also increased (50%, 60%, and 69% in years 1, 2, and 3, respectively), as did the budgets for software applications (60%, 62%, and 70% in years 1, 2, and 3, respectively) and wireless technologies (55%, 67%, and 73% in years 1, 2, and 3, respectively). Service contract budgets (25%, 29%, and 37% in

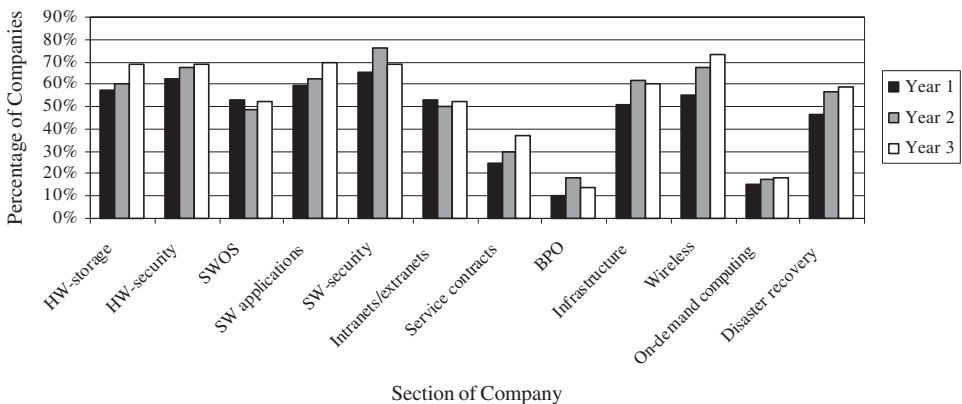


Fig. 1.3. Percentage of companies surveyed with increasing budget trends.

years 1, 2, and 3, respectively) and on-demand budgets (15%, 17%, and 18% in years 1, 2, and 3, respectively) were reported to be increasing by relatively fewer companies, but adoption rates increased over the three-year period. BPO budgets were also reported not to be increasing for a large proportion of the companies (11%, 18%, and 14% in years 1, 2, and 3, respectively), and although they increased from year 1 to year 2, the budgets decreased in year 3. With the hype in the United States for BPO a few years ago, it was surprising that BPO continued to stay on the low end of company budgets. One possible explanation for this low number is that companies did not accurately report on the extent of their BPO budgets for fear of backlash; another reason could be that the lag phenomenon observed for technology adoption may also exist for BPO but may be longer than was observed for technologies. The type of companies that were part of the sample could have also played a role in the low-reported BPO budgets.

1.2.2. Internal organization

Figures 1.4 and 1.5 show the responses obtained from the survey for changes to the workforce and structure of the internal organization.¹

The most significant impact was the high demand for intelligent systems by company executives (92% companies in year 1). The demand came down to 90% in year 2 and 84% in year 3, but still remained high. Close to three-quarters



Fig. 1.4. Percentage of companies that agreed or disagreed that given sections of the workforce were improving due to technology.

¹ These figures should be read as follows: for telecommuting in Fig. 1.4, “Year 1 Agree” refers to the percentage of companies that believed their telecommuting sectors were improving, based on the responses from the 2003–2004 survey. Likewise for telecommuting, “Year 1 Disagree” refers to the percentage of companies that believed their telecommuting sectors had lost value, based on the 2003–2004 survey. The remainder of the segments and bars for both figures can be read using the same methodology.

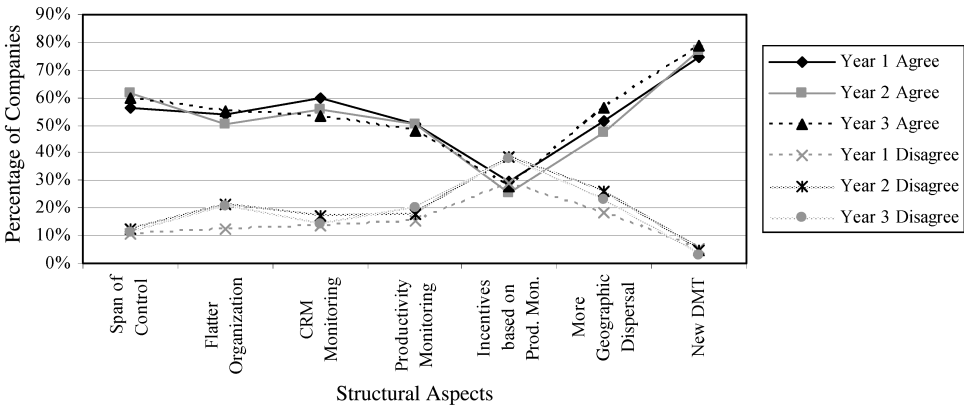


Fig. 1.5. Percentage of companies that agreed or disagreed that given structural aspects were improving due to technology.

(76% in year 1, 70% in year 2, and 72% in year 3) of the respondents believed that more employees were facing a screen in the organization. And about three-quarters (74% in year 1, 78% in year 2, and 78% in year 3) believed that workers needed to constantly retrain in the organization. Some support was also found for reduction in middle-level managers (40% in year 1, 35% in year 2, and 33% in year 3).

Although several phenomenon studied in this section saw an increasing support over the three-year period (telecommuting, teleconferencing, workers needing to retrain constantly, and IT function shifting from staff to line), the biggest increase was observed in web collaborations among workers (from 60% in year 1 and 61% in year 2 to 75% in year 3). Results for automation leading to workforce reductions, outsourcing leading to workforce reductions, and IT function shifting from staff to line were inconclusive, as the percentage of respondents agreeing was about the same as the percentage disagreeing. These data are shown in Fig. 1.4.

Another phenomenon observed was the use of ICT at all levels in the organization — at executive levels for intelligent decision support, at the peer-to-peer level for collaboration, and at the entry level, where a greater number of workers joining the organization were already familiar with technology at the time of their joining the company.

In addition to changes in the workforce, the internal organization was also changing in terms of its structure. Survey responses showed support for the organization becoming virtual (close to half of the respondents agreed or strongly agreed that the organization was becoming geographically dispersed) and heterarchical (more than half the respondents agreed or strongly agreed that the organization was becoming flatter and that the span of control of managers was increasing). Close to half of the respondents also agreed that customer-interacting transactions were being monitored and that automated monitoring of productivity was increasing. However, as many respondents disagreed as agreed on whether incentives were

being increasingly based on the monitoring of productivity. These results are shown in Fig. 1.5.

1.2.3. Outsourcing and offshoring

Outsourcing and offshoring were also studied in this survey. The survey studied what functions were most outsourced, and which were not? Were there differences in terms of outsourcing between IT functions and nonIT functions? What proportion of outsourcing was offshoring?

Figure 1.6 shows the survey responses on the outsourcing of various functions. Overall, more respondents said that they did not outsource than respondents who did. Three functions where a greater or equal number of companies reported that they outsourced than those did not outsource were market research, programming, and payroll. For market research, almost double the number of respondents outsourced (48% in year 1, 44% in year 2, and 43% in year 3) than those who did not outsource (27% in year 1, 35% in year 2, and 34% in year 3); for programming, a slightly greater number outsourced (40% in year 1, 52% in year 2, and 50% in year 3), especially in years 2 and 3, than did not outsource (44% in year 1, 39% in year 2, and 36% in year 3); and for payroll, about the same number outsourced (43% in year 1, 46% in year 2, and 44% in year 3) as did not outsource (43% in year 1, 47% in year 2, and 43% in year 3). Money-related functions, including finance and accounting, were outsourced by the fewest number of respondents; as were Order Fulfillment and RFPs/Bids, all of which were outsourced by less than 10% of the respondents.²

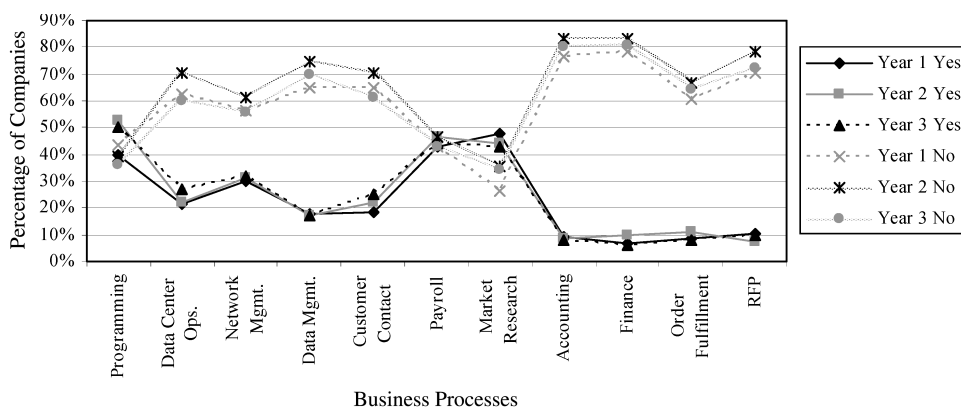


Fig. 1.6. Percentage of companies that outsourced business processes.

² Figure 1.6 should be read as follows: for programming, “Year 1 Yes” refers to the percentage of companies that outsourced their programming processes, based on responses from the 2003–2004 survey. Likewise for programming, “Year 1 No” refers to the percentage of companies that did not outsource their programming processes, based on the 2003–2004 survey. The remainder of the segments and bars can be read using the same methodology.

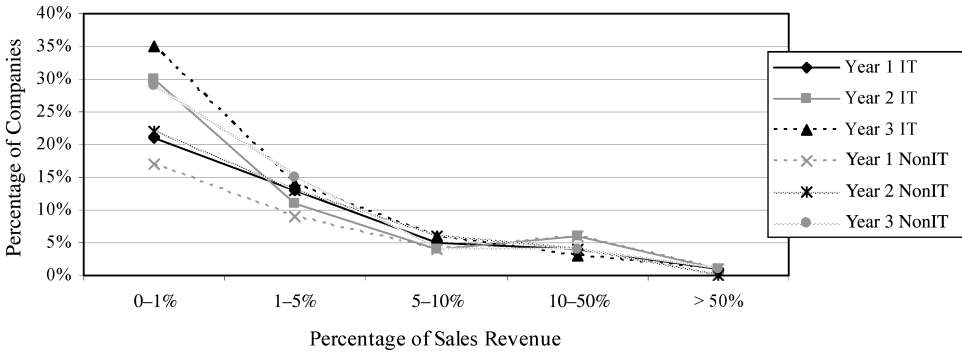


Fig. 1.7. Percentage of companies that used various proportions of their IT and nonIT sales revenue for their outsourcing budgets.³

Results on outsourcing budgets of firms are shown in Fig. 1.7 for IT as well as nonIT functions. Outsourcing budgets were about the same for IT as well as nonIT functions. Only in the 0–1% category, IT function outsourcing budgets (21%, 30%, and 35% in years 1, 2, and 3, respectively) were somewhat higher than nonIT function budgets (17%, 22%, and 29% in years 1, 2, and 3, respectively). Outsourcing in the 1–5% category ranged between 9 and 15% for both IT and nonIT functions. When firms devoted greater than 5% of their revenues to outsourcing, the numbers became quite small — between 4 and 6% for both IT and nonIT functions.

The proportion of outsourced business that was offshored (or BPO) is shown in Fig. 1.8. Only year 2 and year 3 results are shown in this figure, as very few responses were obtained in year 1 and hence not compiled. Results showed that the percentage of companies that were offshoring 0–1% of their outsourced processes went down from 50% to 40% from year 2 to year 3. However, there was an increase in the percentage of companies that were offshoring 1–5%, 10–50%, and greater than 50% of their outsourced processes. Although the number of companies that responded was small, and more data will be needed before reliable conclusions can be reached, the findings could be an indication that companies that were offshoring small amounts were stopping to do so, but companies that were offshoring greater amounts had worked through the difficulties and were now sending more business overseas.

1.2.4. Forward-facing relationships

This section discusses the changes in a company’s relationships with its customers, namely Customer Relationship Management (CRM) functions with the adoption

³ This figure should be read as, for example, “In Year 3, for 35% of the respondents, their outsourcing budgets were 0–1% of their sales revenues”.

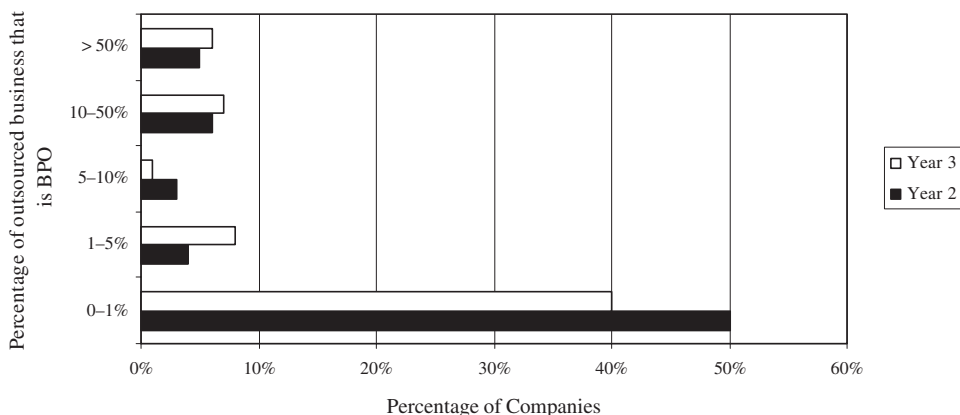


Fig. 1.8. Percentage of total outsourced business that was BPO.

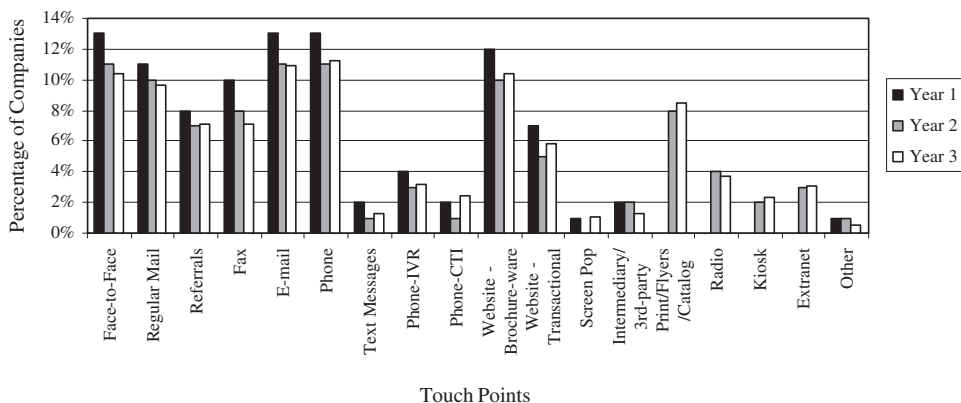


Fig. 1.9. Percentage of companies using various touch points.

of ICT. Aspects of CRM that were addressed include touch points used to interact with customers, customer data analysis, and customer segmentation. Advertising methods, on-line advertising budgets, change in image of the company in going online, and the degree of automation for CRM functions were also observed. An analysis of the proportion of companies that have an online presence as compared to a traditional presence was also included. A comparison of the differences between traditional and on-line businesses was also made.

Figure 1.9 shows the relative popularity of various touch points for organizations to communicate with their customers. In year 1, 14 touch points were listed in the questionnaire; print/flyer/catalog, radio, kiosk, and extranet were added in years 2 and 3. Due to the additional choices available and respondents having the option to select all touch points they used, the proportions appear to be lower for some of the touch points in years 2 and 3 that were listed in the year 1 survey.

Phone, e-mail, face-to-face, company website (informational), traditional mail, and print/flyers/catalogs were each used by about 10% of the firms surveyed, indicating that online touch points have become as popular as traditional touch points. Radio, kiosk, extranet, text messaging, phone Interactive Voice Response (IVR), and phone Computer Telephony Integration (CTI) were not used as frequently. The proportion of respondents using each touch point did not change much from year to year.

Figures 1.10 and 1.11 show how and using what tools companies try to get a better understanding of their customers for marketing purposes; the survey asked specifically about customer data analysis methods and customer segmentation.

As shown in Fig. 1.10, trends did not vary significantly from year to year. The more popular methods were customer profiling (15%, 14%, and 17% in years

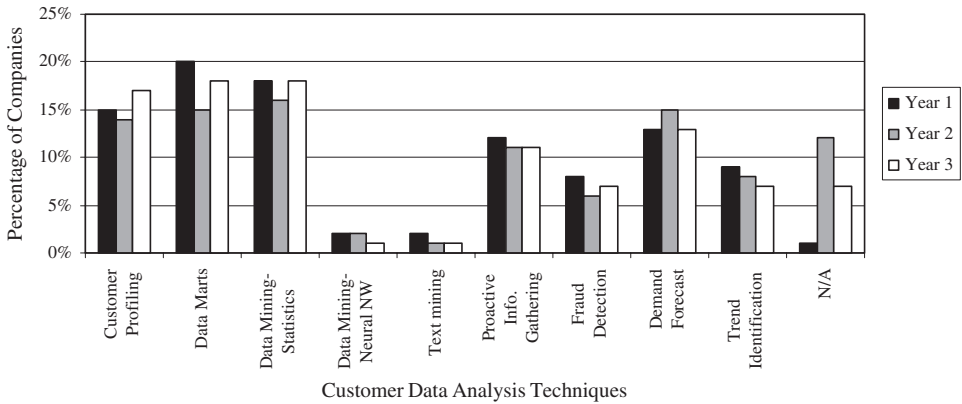


Fig. 1.10. Percentage of companies using various techniques for customer data analysis.

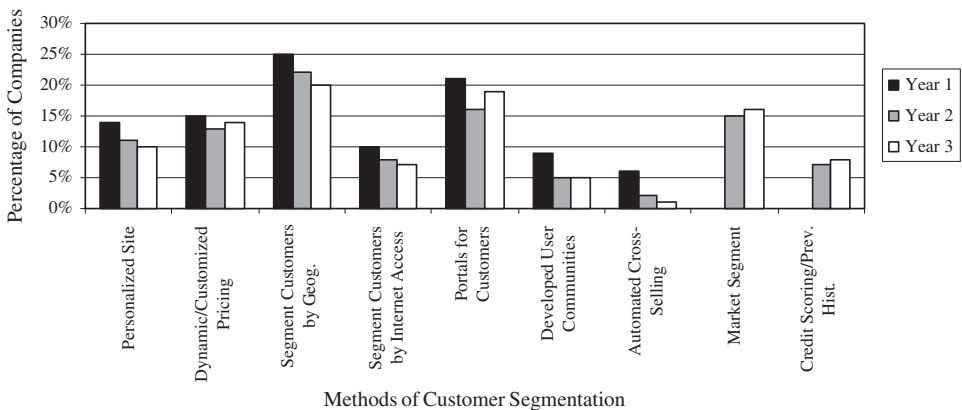


Fig. 1.11. Percentage of companies that used various methods for customer segmentation.

1, 2, and 3, respectively), data marts and data warehouses (20%, 15%, and 18% in years 1, 2, and 3, respectively), data mining using statistics (18%, 16%, and 18% in years 1, 2, and 3, respectively), followed by demand forecasting (13%, 15%, and 13% in years 1, 2, and 3, respectively) and proactive information gathering (12%, 11%, and 11% in years 1, 2, and 3, respectively). The percentage of respondents using these methods were all below 20%, indicating that customer data analysis was more hype at this time than actual adoption. It could also be that the lag effect between hype and actual adoption was occurring for customer data analysis tools. The least-used methods were data mining using neural networks and text mining; both were used by only 2% of the respondents.

Figure 1.11 shows the popularity of mechanisms used for customer segmentation by firms. Segmentation of customers by geography was the most popular (25%, 22%, and 20% for years 1, 2, and 3, respectively), followed by portals for customers (21%, 16%, and 19% for years 1, 2, and 3, respectively). Market segment (added in year 2) with 15% and 16% in years 2 and 3, respectively, dynamic/customized pricing with 15%, 13%, and 14% for years 1, 2, and 3, respectively, and personalization of website by customers with 14%, 11%, and 10% for years 1, 2, and 3, respectively, were also used by organizations for customer segmentation.

As shown in Fig. 1.12, another forward-facing factor the survey looked at was the degree of automation of CRM functions. Survey findings showed that the help desk function was automated by 58% of the respondents in year 1, although it reduced somewhat to 54% since then in both years 2 and 3. Content management of the website (automated by 43%, 46%, and 47% in years 1, 2, and 3, respectively) and marketing (automated by 29%, 31%, and 40% in years 1, 2, and 3, respectively) were the two CRM functions that continued to have an increased automation over the survey's three-year period.

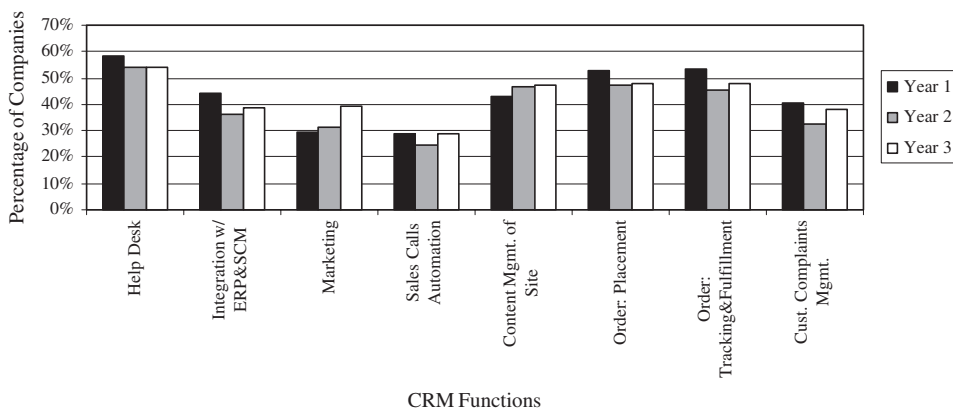


Fig. 1.12. Percentage of companies with some degree of automation of CRM functions.

The rest of the questions in the Forward-facing category focused on understanding changes in firms brought about by going online. Specifically, the survey questions in the rest of this section studied changes to the company concept, methods used for online advertising, budget for online advertising, extent of image change, percentage of firms with online versus traditional presence, and differences between traditional and online businesses. Results from survey responses for these categories are shown in Figs. 1.13–1.16.

Figure 1.13 looks at the advertising methods used online. The most used methods included incentives in print (a coupon sent in print that can be redeemed online) (22%, 20%, and 17% in years 1, 2, and 3, respectively), advertisements on other websites (21%, 15%, and 16% in years 1, 2, and 3, respectively), advertisements on search engines (17%, 12%, and 14% in years 1, 2, and 3, respectively) and web banners (used by 15%, 9%, and 13% in years 1, 2, and 3, respectively).

Figure 1.14 shows the change in the concept of a company with ICT deployment. That is, whether a company had changed its logo, name, slogan, or branding concept in establishing an on-line presence. Over a quarter of the companies had changed their branding concept in year 3, as compared to 23% in years 1 and 2. Logo change was stable with 23%, 23%, and 22% in years 1, 2, and 3, respectively. However, the name change was not a popular step that companies took in going online (7%, 8%, and 7% in years 1, 2, and 3, respectively).

Figure 1.15 shows the number of companies that had brick and mortar stores (traditional) only, those that had traditional stores and also sold products and services online, those that were primarily store-based but offered some products and services online, and those that sold online only. Over half (58%) of the companies had a traditional and an online presence in year 1. Although this number reduced to 47% and 46% in years 2 and 3, respectively, it still continued to be the majority trend. In addition, close to one-third of the companies (33%, 36%, and 36% in years 1, 2, and 3, respectively) had a traditional presence only, although the number of traditional

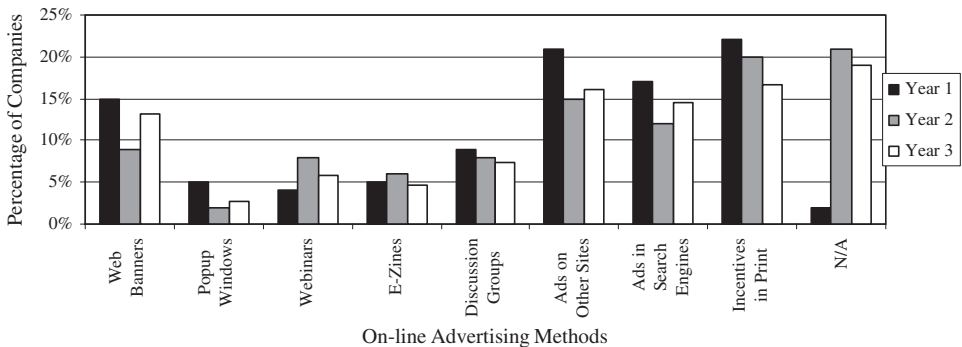


Fig. 1.13. Percentage of companies using various on-line advertising methods.

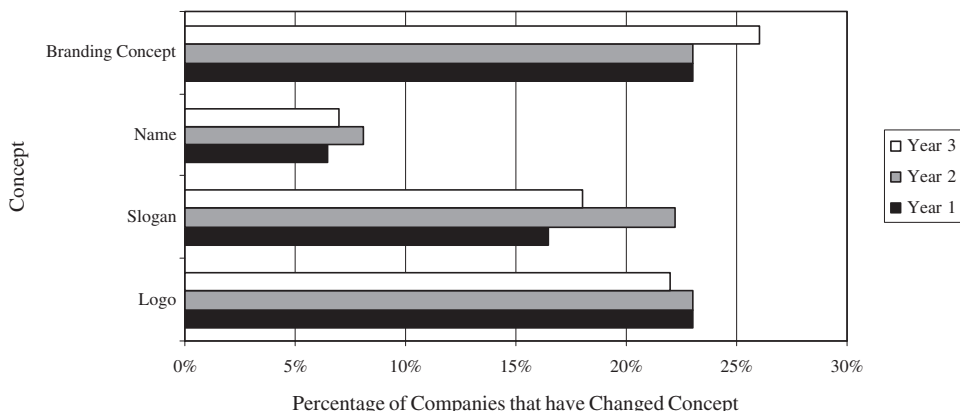


Fig. 1.14. Percentage of companies that have changed various aspects of their images.

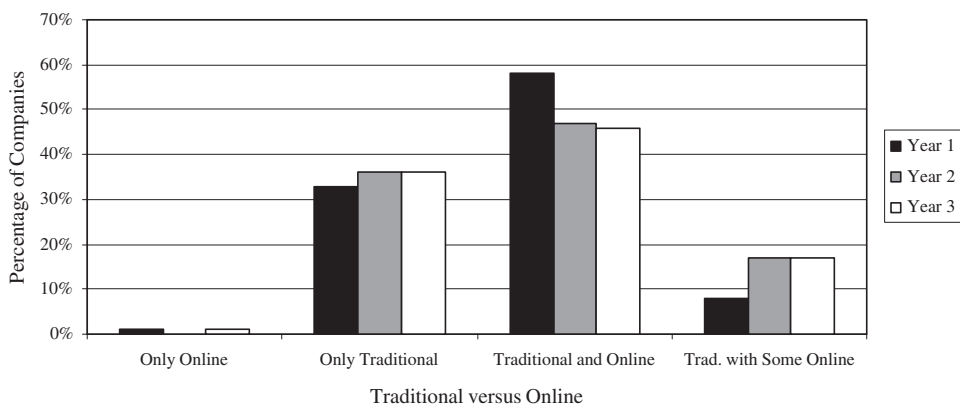


Fig. 1.15. Percentage of companies that used traditional and/or on-line methods to sell products and services.

companies with some on-line products and services was observed to increase over the three years (8%, 17%, and 17% in years 1, 2, and 3, respectively). Only one company has reported selling online with no store.

Figure 1.16 aims to capture the differences between traditional and online businesses in various categories, including the cost of products, pricing, operating margins, revenue, sales volume, number of products and services, data collected, and self-services tasks (tasks performed by customers in online purchases that were traditionally performed by employees).

The most significant finding was probably that sales volume was lower for online sales than traditional sales. Close to one-third of the respondents agreed on this phenomenon for all three years. About a quarter of the respondents also agreed that fewer products and services were available online, and about the same amount

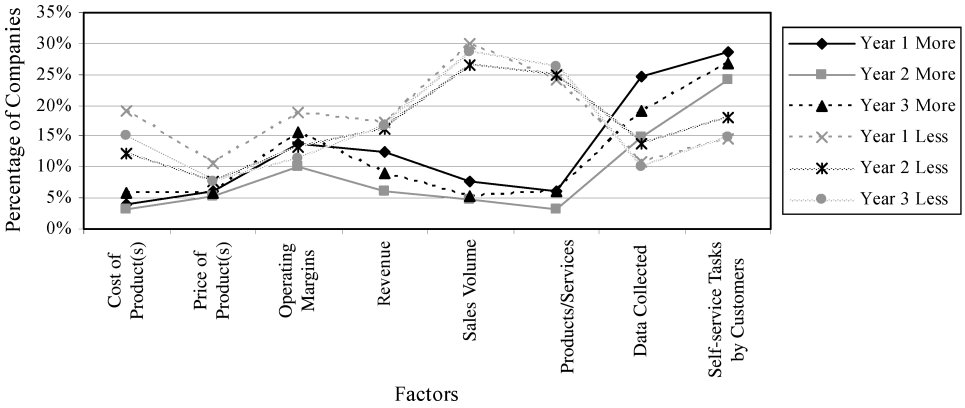


Fig. 1.16. Percentage of companies that reported that various sections were either higher or lower when dealt with online than traditionally.

Table 1.1. Annual on-line advertising budgets as a percentage of annual advertising budgets.

	Year 2 2002 (in %)	Year 2 2003 (in %)	Year 2 2004 (estimated) (in %)	Year 2 2005 (predicted) (in %)	Year 3 2004 (in %)	Year 3 2005 (in %)	Year 3 2006 (estimated) (in %)	Year 3 2007 (predicted) (in %)
No response	81	79	78	78	79	79	79	79
Up to 1%	5	5	5	4	10	6	6	6
1–5%	10	10	8	8	8	8	8	8
5–10%	2	4	4	3	3	7	7	7
10–50%	2	2	4	5	0	0	0	0
>50%	0	1	1	1	0	0	0	0

reported that self-service tasks (tasks performed by customers in online operations that were traditionally performed by employees) were higher for online operations. Somewhat fewer respondents (25%, 15%, and 19% in years 1, 2, and 3, respectively) reported collecting more data for online businesses than for traditional businesses.⁴

Online advertising budgets are shown in Table 1.1. Few responses were received for year 1, so only year 2 and year 3 budgets are reported. Respondents were asked to estimate their annual online advertising budget as a percentage of their annual advertising

⁴ Figure 1.16 should be read as follows: for self-service tasks, “Year 1 More” refers to the percentage of respondents that reported higher self-service tasks for online sales based on the responses from the 2003–2004 survey. “Year 2 More” and “Year 3 More” are similarly companies that reported higher operating margins for online sales in years 2004–2005 and 2005–2006 respectively. Likewise “Year 1 Less” refers to the percentage of respondents that reported fewer self-service tasks for online sales in year 2003–2004 and “Year 2 Less” and “Year 3 Less” are similarly for years 2004–2005 and 2005–2006, respectively.

budget. Close to 80% of the respondents did not respond. Results for the 20% that responded are shown in Table 1.1.

1.2.5. Backward-facing relationships

This section investigates changes in a company’s relationships with its partners with the adoption of ICT. The survey sought information on the current state of adoption for various technologies for Partner Relationship Management (PRM) and the popularity of various business to business (B2B) mechanisms used for purchasing.

Figure 1.17 shows the state of automation for PRM at the time of each of the surveys. EDI was the most used technology with increasing adoption over the three-year period (39%, 39%, and 43% in years 1, 2, and 3, respectively), followed by web-enabled communication (32%, 35%, and 31% in years 1, 2, and 3, respectively). An increasing trend was also seen for the adoption of XML (26%, 26%, and 28% in years 1, 2, and 3, respectively), e-payment (25%, 28%, and 34% in years 1, 2, and 3, respectively), and e-procurement (22%, 22%, and 25% in years 1, 2, and 3, respectively).

Figure 1.18 shows the planned automation for PRM technologies. Two noticeable trends are the decrease in the planned use of EDI (7%, 6%, and 4% in years 1, 2, and 3, respectively) and e-payment (20%, 15%, and 12% in years 1, 2, and 3, respectively) in the three-year period. The increasing adoption of these two technologies over the three-year period combined with their decreasing planned adoption show that the validity of the data as ICT planned in one year was adopted in the next year.

Planned automation of collaborative planning decreased from 13% in year 1 to 10% in year 2 and 8% in year 3. Planned web-enabled communication remained steady at 13%, 14%, and 13% in years 1, 2, and 3, respectively, which may be indicative of

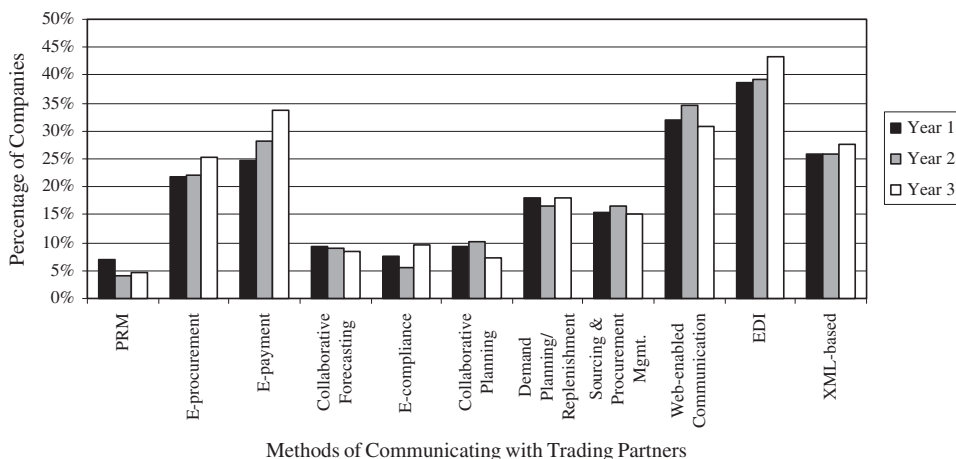


Fig. 1.17. Percentage of companies that had PRM technologies.

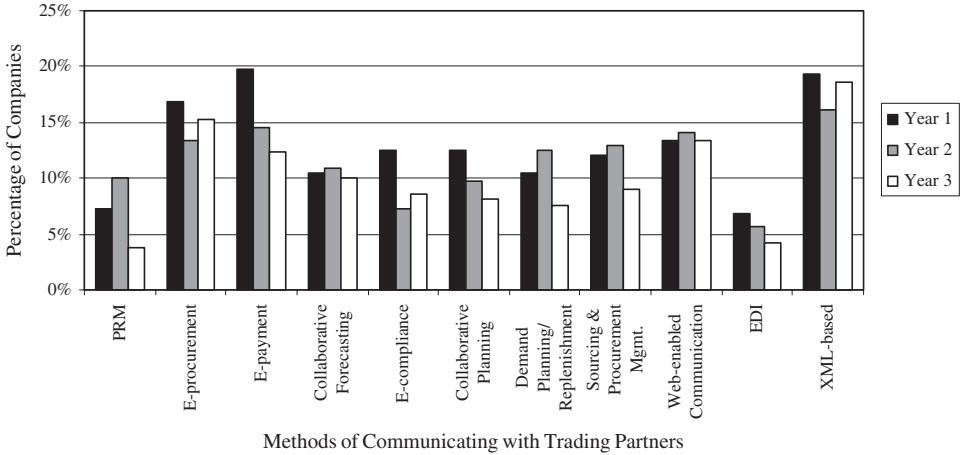


Fig. 1.18. Percentage of companies that planned to adopt PRM technology.

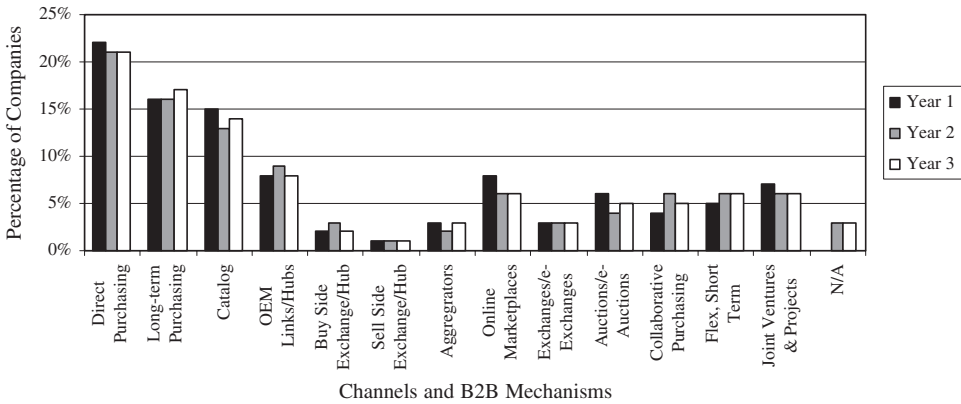


Fig. 1.19. Percentage of companies that used various B2B mechanisms for purchasing.

completed adoption of all companies that would have adopted it. Collaborative forecasting was also steady at 11%, 11%, and 10% over the three-year period. Planned XML adoption was 19%, 16%, and 19% in years 1, 2, and 3, respectively.

Figure 1.19 shows the B2B mechanisms used by companies for purchasing. Direct purchasing (22%, 21%, and 21% in years 1, 2, and 3, respectively), long-term purchasing contracts (16%, 16%, and 17% in years 1, 2, and 3, respectively) and catalogs (15%, 13%, and 14% in years 1, 2, and 3, respectively) were the most used mechanisms. Sell side exchanges/hubs (1% for all three years), buy side exchanges/hubs (2%, 3%, and 2% in years 1, 2, and 3, respectively), and xchanges/e-xchanges (3%, 3%, and 3% in years 1, 2, and 3, respectively) were the least used B2B mechanisms. Usage of all B2B mechanisms remained about the same over the three-year period.

1.2.6. Business results

This section discusses the impacts of ICT adoption on business and strategic results. Business results include various costs (such as internal communication, market research, etc.) and bottom line results (such as profit, revenue, etc.). Strategic areas include factors such as knowledge of customer behavior, information on competitor’s offerings, etc. Business and strategic results are listed below.

Figure 1.20 shows the business results that increased (increased and significantly increased) and the business results that decreased (decreased and significantly decreased) over the three-year period. For the most part, both the increased and the decreased business results followed the same trends, adding to the validity of the survey findings.

Costs including internal communication (41%, 37%, and 37% for years 1, 2, and 3, respectively), customer service (29%, 31%, and 30% for years 1, 2, and 3, respectively), production (34%, 35%, 35% for years 1, 2, and 3, respectively), human resources (25%, 26%, and 20% for years 1, 2, and 3, respectively), and market research (23%, 21%, and 25% for years 1, 2, and 3, respectively) were reduced with adoption of ICT. New product time to market (24%, 23%, and 21% for years 1, 2, and 3, respectively) also decreased.

Business results that increased with ICT adoption included technology costs (53%, 48%, and 53% for years 1, 2, and 3, respectively), profits (42%, 35%, and 39% for years 1, 2, and 3, respectively), margins (35%, 30%, and 38% for years 1, 2, and 3, respectively), revenues (34%, 30%, and 39% for years 1, 2, and 3, respectively), and consultancy and collaboration costs (34%, 24%, and 30% for years 1, 2, and 3, respectively). Close to a quarter of the respondents also reported increases in market share (24%, 19%, and 24% for years 1, 2, and 3, respectively)

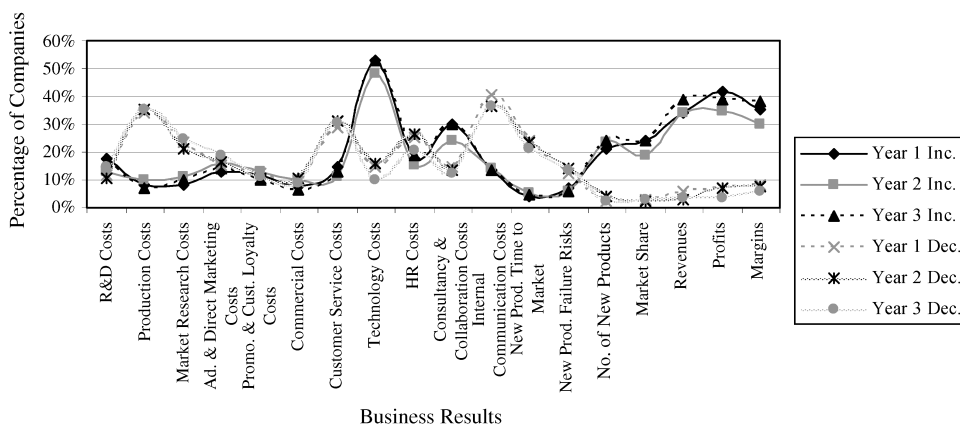


Fig. 1.20. Percentage of companies that reported various business results as either increasing or decreasing.

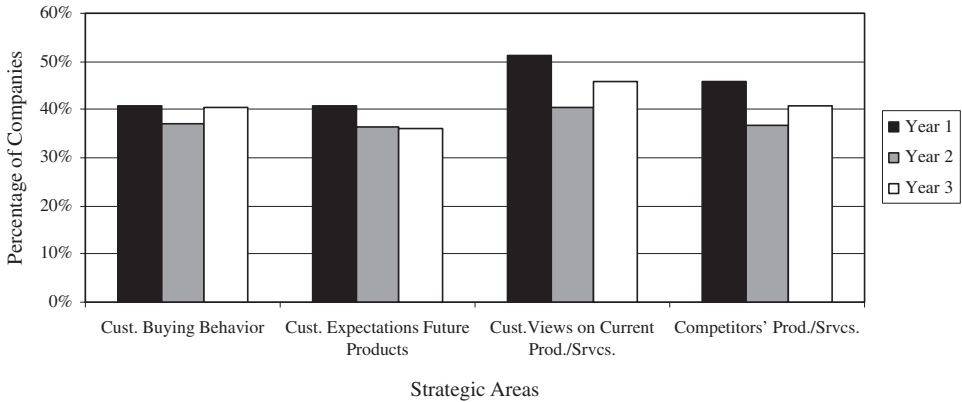


Fig. 1.21. Percentage of companies that reported increases in their understanding of various strategic areas.

and the number of new products (21%, 23% and 24% for years 1, 2, and 3, respectively).

Survey responses for strategic results are shown in Fig. 1.21. Four strategic areas were considered. The data indicated that all four strategic areas have been positively impacted by ICT adoption. These enhancements included improved understanding of customer satisfaction for the current products/services offered (51%, 40%, and 46% for years 1, 2, and 3, respectively) and better knowledge of competitor’s products and services (46%, 37% and 41% for years 1, 2, and 3, respectively). The other two strategic factors — an improved understanding of customer buying behavior and better understanding of customer expectations on future products — were also reported to have improved by close to 40% of the respondents, as shown in Fig. 1.21.

1.2.7. Globalization

Globalization is the spread of businesses to countries and regions outside of the base country. It is measured by using various factors to estimate the geographic reach of an organization.

Figure 1.22 shows the regions that companies based in the United States have expanded to. Firms based in the United States most often expanded to Canada and Mexico (32%, 27%, and 22% in years 1, 2, and 3, respectively), which could be attributed to close proximity of these countries to the United States. The next popular region for expansion was Western Europe (23%, 22%, and 20% in years 1, 2, and 3, respectively), which could be due to similarities in the spoken language and in cultures. Latin America was reported as the next most popular destination by the US firms to globalize to with 19%, 19%, and 15% in years 1, 2, and 3, respectively;

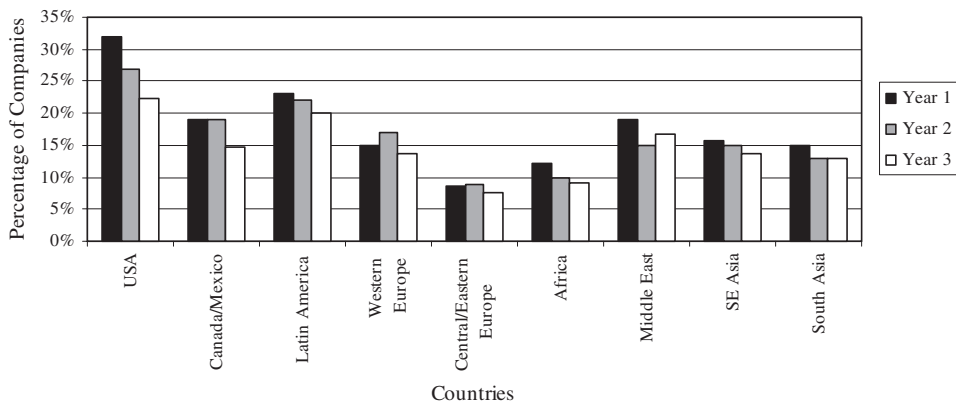


Fig. 1.22. Percentage of companies doing business in various countries.

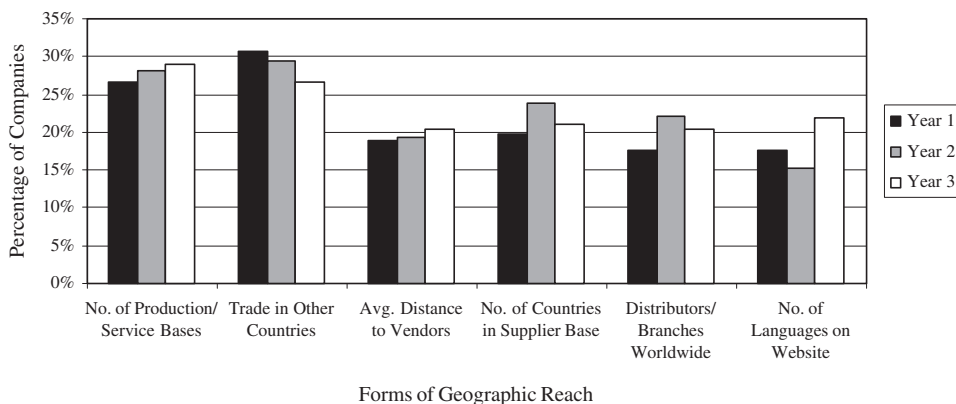


Fig. 1.23. Percentage of companies using various forms of geographic reach.

the region’s popularity could be due to its proximity to the United States and the lower costs associated with the region. The Asian regions, which shared neither proximity nor language or culture, were interestingly the next most popular region for globalization with SouthEast Asia chosen for expansion by 19%, 15%, and 17% of the companies in years 1, 2 and 3 respectively. About 15% of the respondents reported expansion to South Asia and East Asia. Cost was thought to be the incentive for globalizing to these Asian regions.

Geographic reach of US-based firms was measured using various factors. Results for the three years are shown in Fig. 1.23. Overall, geographic reach increased, as supported by all of the following findings. Twenty seven percent of the companies reported an increase in the number of production/service bases in other countries in year 1, 28% in year 2, and 29% in year 3. Also 19% of the companies reported an increase in the average distance to suppliers and vendors in

years 1 and 2; 20% in year 3. Close to one-third of the companies (31% in year 1, 29% in year 2, and 27% in year 3) reported an increase in their trade in other countries. Other factors including the number of countries in a firm's supplier base, the presence of distributors/branches around the world, and the number of languages in which the website brochures were available were also reported to be positive by about one-fifth of the companies, indicating that geographic reach has increased. Incentives for increased geographic reach include lower costs, larger talent pool, and new markets.

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Appendix A: Survey Respondent Sample Characteristics

Table A.1.

Annual revenues	Year 1 (in %)	Year 2 (in %)	Year 3 (in %)
Up to 100m	27.8	31.1	30.0
100m–1b	29.8	34.7	38.0
Over 1b	10.5	10.1	8.0
No response	31.9	24.2	25.0

Table A.2.

Number of employees	Year 1 (in %)	Year 2 (in %)	Year 3 (in %)
Up to 200	12.1	8.1	12.0
200–1000	43.6	37.5	37.0
>1000	39.1	40.7	39.0
No response	5.2	13.7	12.0

Table A.3.

IT budget as a percentage of annual revenue	Year 1 (in %)	Year 2 (in %)	Year 3 (in %)
Up to 1%	22.9	25.8	17.0
1% to 5%	33.0	33.9	43.0
Over 5%	13.3	16.9	16.0
No response	30.6	23.4	24.0

Table A.4.

Number of IT employees	Year 1 (in %)	Year 2 (in %)	Year 3 (in %)
Up to 10	31.1	25.4	25.7
10–50	40.0	33.9	35.7
>50	23.8	25.8	26.2
No response	5.2	14.9	12.4

Table A.5.

SIC codes	Year 1 (in %)	Year 2 (in %)	Year 3 (in %)
Wholesale trade	21.91	7.26	7.0
Educational services	15.25	10.48	12.0
Retail trade	10.17	—	2.0
Government	9.32	—	6.0
Finance and insurance	8.05	—	7.0
Healthcare & social assistance	7.63	6.85	12.0
Professional, scientific & technical services	5.51	8.47	9.0
Information	4.66	2.82	3.0
Construction	3.81	5.65	2.0
Manufacturing	3.81	26.21	17.0
Utilities	2.97	0.81	1.0
Administrative & support services, waste management & remediation services	2.97	0.40	—
Other services	2.12	2.02	2.0
Transportation & warehouse	1.27	2.42	1.0
Arts, entertainment, & recreation	0.85	0.40	—
Accommodation & food services	0.42	0.81	—
Public administration	—	9.27	—

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Uday S. Karmarkar has been the LA Times Professor of Technology and Strategy at the UCLA School of Management since 1994. He had previously taught at the Graduate School of Business at the University of Chicago (1975–1979) and the Simon School at the University of Rochester (1979–1994), where he held the Xerox Chair in Operations. Professor Karmarkar has published over 75 research papers and articles, has founded two academic journals, and is on several editorial boards. His research interests include the information economy, service industrialization, technology management, and competitive strategy. He has undertaken projects in areas like technology management, industrial marketing, manufacturing systems, supply chain management, and service strategy with over 45 firms in the United States, Europe, and Asia. Professor Karmarkar holds a B.Tech. from IIT Bombay and a PhD in Management Science from MIT. He has served on the Advisory Board of IIT Bombay until 2007, is on the Advisory Board of the SJM School of Management at IITB, and is on the board of directors of the IITB Heritage Fund (USA). He has received the Distinguished Alumnus and Distinguished Service awards from IITB and the Distinguished Service Award from M&SOM (Informs). He was recently made an Honorary Fellow of IITB. Professor Karmarkar is on the Advisory Board of the Services Research and Innovation Initiative (an industry-sponsored consortium), and he is on the International Council (Ministry of the Economy) reviewing the Digital Strategy for Chile 2008–2012. He is also an advisor to several companies in both traditional and new technology sectors.

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Vandana Mangal is an Associate Research Director for the BIT Global Research Network with the UCLA Anderson School of Management. She has conducted several research studies in the technology management area and managed and co-ordinated several projects with global companies. She has published various papers and articles in journals, magazines, and books, many in collaboration with global researchers, and has edited two books. Vandana has given talks at several domestic and global conferences, participated in panels, and chaired conference sessions. She has also organized and run many conferences and has written and received many grants. She has taught and organized executive education programs in collaboration with global organizations and with global participants. Vandana has been involved with consulting projects in various areas and co-conducted company case studies.

Before joining UCLA, she worked at Intel as the Intel-HP Alliance Manager. At Intel, she developed processes to handle various types of Intellectual Property exchanges between Intel and Hewlett Packard and trained over 1000 managers and engineers on these processes at several Intel sites. She also worked at AE Business Solutions Consulting Company as a Senior Consultant for three years; there she worked with various organizations in the areas of education, telecommunications, recreation, and law both in public and private sectors. Before moving to industry, Vandana taught at the University of Wisconsin, Madison School of Business and at the University of Wisconsin, Platteville Computer Science department. Vandana completed her PhD from the Heinz School at Carnegie Mellon University; her undergraduate degree is in Electrical Engineering.