French Industry Adoption of Information and Communication Technologies (ICTs)

At the end of 1999, nearly 70% of France’s industrial-sector enterprises with over 20 employees were connected to the Internet, 80% had networked PCs, and nearly 90% used mobile telephones. These key tools of the information and communication technologies (ICTs) are now in standard use in large firms, where penetration rates exceed 95%. Penetration of other ICT tools is accelerating: in late 1999, 39% had set up a web site and 37% had adopted Enterprise Resource Planning (ERP) business management software. Yet fewer than 10% had set up an extranet. ICTs are penetrating all sectors of industry, with penetration rates generally higher in firms that are large, innovative and open to foreign trade. In ICT deployment strategy, the main objective of industrial enterprises is to improve customer service, with cost cutting and improving the firm’s internal organization ranked as the next two objectives. Alongside technical difficulties in ICT deployment, enterprises report increasing difficulty in recruiting competencies, and in training or redeploying personnel.

Networked PCs, digital telephone lines, mobile telephones, and Internet access, while these key technologies are already standard in large firms, generalization across the full range of industrial enterprises is well along. Eight out of ten industrial enterprises have networked PCs, and nearly six out of ten have made portable computers available to some employees. The leap in networked PCs observed in 1998 has now been followed by the surge in mobile telephones and the vogue for the Internet. Nearly nine out of ten industrial enterprises with over 20 employees have mobile telephones, with forecasts for acquisition running very high. Three-fourths use Integrated Services Digital Network (ISDN) links, which provide greater bandwidth, higher speed and greater security for transmissions. Over 68% were connected to the Internet at the end of 1999.
Increasing use of web sites and ERP software

Nearly 40% of enterprises have set up a web site, first to serve as the company’s showcase and convey a modern image for the firm. Since 1997, Enterprise Resource Planning (ERP) software has made a breakthrough; over 37% of enterprises have installed systems and 23% use them intensively. ERP software integrates different functional modules (e.g., purchasing and accounting) with a single database, and is often used in conjunction with other tools such as electronic data interchange (EDI) or intranets.

Enterprises have increased their information exchanges with outside partners, particularly through EDI, which is used by nearly 44% of enterprises, and three-fourths of large firms. In particular, over a third of firms use EDI to exchange data with their subcontractors, suppliers and customers, and nearly 15% for transfers with public administrations and other government bodies.

The emergence of new communications tools

The penetration of new communication technologies is still in an emergent phase. In the area of group telecommunications, only 14% of enterprises use conference calls for meetings; and only half that percentage use videoconferencing. In the area of mobile communications, pagers are used in only 15% of enterprises, due to competition from mobile telephones. In the area of teleservices, which combine telecommunications and information technology, fewer than 12% of enterprises use call centers (whether in-house or outsourced). Plans for call centers are not widespread, and are only slightly higher in large firms. Similarly, toll free numbers are still not widely used.

Intranets are data communication networks based on Internet technology that are restricted to use within an enterprise. They are currently used by one out of five enterprises. Extranets are intranets that are open to some of the firm’s partners; deployment remains low, as fewer than 10% of firms have extranets.

Large firms in the lead

The larger the firm, the more intensively it uses the various information technologies. Over 90% of enterprises with over 500 employees have networked PCs, mobile telephones, ISDN links, Internet connections and local enterprise networks.

Information and Communication Technologies (ICTs) : processes, communications, and exchanges

Information and communication technologies are used in operations that process, produce and exchange information. Technological progress has made it possible to automate most physical tasks that simply require repetitive operations (manufacturing, assembling, testing, etc.). ICTs are now extending to non-physical activities that are at the heart of human intervention in the production process: reacting, interpreting, evaluating, communicating, planning, deciding, and creating.

These technologies have emerged in several waves, since the invention of the computer.

1960s : automation of administrative processes (accounting, payroll, inventory management, billing)
1970s : automation of production processes (robotics and production automation)
1980s : automation of individual office work (PCs and office automation)
1990s : networking of information systems and PCs, development of electronic data interchange (EDI) systems
2000 : automation of trade (electronic commerce). This fifth wave of technological innovations is linked both to the generalization of technologies introduced in the 1980s and 1990s (mobile telephones, e-mail systems, portable computers) and to the Internet boom.

Further, the emerging new technologies have been disseminated swiftly in large firms, 56% of which use videoconferencing and 42% of which use call centers, compared with fewer than one in ten of all the firms surveyed. Along the same lines, the penetration rates for extranets (37%) and intranets (73%) are over three times higher for large firms than for all the firms surveyed.

The principal sectors using ICTs are energy…

Energy-sector firms, which manage large networks, make considerable use of information and communication technologies. The fuel production sector is in the lead for Internet technologies (web sites, intranets and extranets). While utilities use Internet technologies less, they have even higher penetration rates for IT, including strong use of EDI (69%) and call centers (33%).

… the ICT industry, naturally enough…,

ICT-sector enterprises are naturally among the frontrunners, although they trail the sectors mentioned above. Manufacturers of electrical and electronic equipment are big users of Internet technologies; 53% have a web site. They are also highly equipped with modern telecommunications facilities (90% have ISDN links). Electrical and electronic component manufacturers, in particular, stand out due to high use of Internet tools.

… and the pharmaceuticals and chemicals sectors

Pharmaceuticals, fragrances, and cleaning products is among the sectors reporting the greatest use of information technologies. Use of networked information technology systems is very

The ICT Survey

The Survey of Information and Communication Technologies (ICTs) was conducted by Sessi by mail in late 1999. It examined deployment and use of ICTs by enterprises in the industry and energy sectors. The survey was conducted using a sample of 5,600 French industrial enterprises with over 20 employees. All enterprises with over 500 employees were queried. The response rate was 62%.

Enterprises were questioned on their degree of implementation and use of the various information and communication technologies (information technology, telecommunications and the Internet), their plans for implementation in the short term (by 2001), the objectives they pursue, and the obstacles encountered in putting these tools in place.
### ICTs by industry

<table>
<thead>
<tr>
<th>Mobile telephones</th>
<th>ISDN links</th>
<th>call centers</th>
<th>video-conferencing</th>
<th>Networked PCs</th>
<th>ERP software</th>
<th>EDI</th>
<th>Internet connection</th>
<th>Web site</th>
<th>intranet</th>
<th>Extranet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel production</td>
<td>100</td>
<td>90</td>
<td>14</td>
<td>13</td>
<td>92</td>
<td>56</td>
<td>65</td>
<td>98</td>
<td>59</td>
<td>54</td>
</tr>
<tr>
<td>Utilities (electricity, gas, and water)</td>
<td>100</td>
<td>92</td>
<td>33</td>
<td>15</td>
<td>91</td>
<td>47</td>
<td>69</td>
<td>88</td>
<td>46</td>
<td>52</td>
</tr>
<tr>
<td>Electrical and electronic equipment</td>
<td>98</td>
<td>90</td>
<td>12</td>
<td>14</td>
<td>91</td>
<td>50</td>
<td>46</td>
<td>91</td>
<td>53</td>
<td>42</td>
</tr>
<tr>
<td>Pharmaceuticals, fragrances, and cleaning products</td>
<td>93</td>
<td>79</td>
<td>22</td>
<td>23</td>
<td>85</td>
<td>61</td>
<td>56</td>
<td>80</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>Chemicals, rubber and plastics</td>
<td>94</td>
<td>80</td>
<td>13</td>
<td>12</td>
<td>91</td>
<td>50</td>
<td>47</td>
<td>90</td>
<td>49</td>
<td>33</td>
</tr>
<tr>
<td>Automobile manufacturing</td>
<td>91</td>
<td>79</td>
<td>10</td>
<td>12</td>
<td>88</td>
<td>50</td>
<td>48</td>
<td>74</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>Printing, publishing, and reproduction</td>
<td>90</td>
<td>78</td>
<td>17</td>
<td>21</td>
<td>79</td>
<td>39</td>
<td>51</td>
<td>69</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td>Mechanical engineering products</td>
<td>86</td>
<td>86</td>
<td>14</td>
<td>4</td>
<td>89</td>
<td>32</td>
<td>44</td>
<td>78</td>
<td>47</td>
<td>22</td>
</tr>
<tr>
<td>Home appliances, furniture, and other durables</td>
<td>93</td>
<td>74</td>
<td>9</td>
<td>5</td>
<td>80</td>
<td>32</td>
<td>37</td>
<td>70</td>
<td>40</td>
<td>23</td>
</tr>
<tr>
<td>Mineral products, industries</td>
<td>93</td>
<td>73</td>
<td>13</td>
<td>7</td>
<td>79</td>
<td>36</td>
<td>43</td>
<td>73</td>
<td>41</td>
<td>17</td>
</tr>
<tr>
<td>Shipbuilding, aircraft, and railroad equipment</td>
<td>84</td>
<td>68</td>
<td>5</td>
<td>6</td>
<td>68</td>
<td>38</td>
<td>47</td>
<td>67</td>
<td>41</td>
<td>24</td>
</tr>
<tr>
<td>Wood and paper industries</td>
<td>86</td>
<td>76</td>
<td>7</td>
<td>6</td>
<td>76</td>
<td>37</td>
<td>40</td>
<td>60</td>
<td>34</td>
<td>19</td>
</tr>
<tr>
<td>Textile industries</td>
<td>86</td>
<td>69</td>
<td>9</td>
<td>3</td>
<td>75</td>
<td>38</td>
<td>39</td>
<td>64</td>
<td>30</td>
<td>19</td>
</tr>
<tr>
<td>Metals processing and metalworking</td>
<td>87</td>
<td>70</td>
<td>4</td>
<td>5</td>
<td>80</td>
<td>34</td>
<td>48</td>
<td>60</td>
<td>34</td>
<td>15</td>
</tr>
<tr>
<td>Apparel and leather industries</td>
<td>77</td>
<td>52</td>
<td>6</td>
<td>5</td>
<td>57</td>
<td>24</td>
<td>33</td>
<td>50</td>
<td>30</td>
<td>11</td>
</tr>
<tr>
<td>All industrial sectors (including energy)</td>
<td>89</td>
<td>74</td>
<td>10</td>
<td>7</td>
<td>81</td>
<td>37</td>
<td>44</td>
<td>69</td>
<td>39</td>
<td>23</td>
</tr>
</tbody>
</table>

Source: Sessi, 1999 ICT Survey

Industries are ranked according to their use of ICTs, which is computed using the mean of the penetration rates of the different technologies.

---

The objective cited second most often as “very important” in ICT deployment is cost cutting, which was identified as “very important” by over a third of firms, with particularly high rates (approximately 47%) in automobile manufacturing and in the apparel and leather industries.

Improving the firm’s internal organization ranked third among the objectives identified as “very important” (by 29% of enterprises). It ranked second among the factors firms identified as either “important” or “very important.” The aim here is to improve the firm’s internal processes so it can be faster and more reactive. Speed is increasingly crucial in competition.

Other frequently mentioned objectives are “improving product quality,” “production flexibility,” and “facilitating coordination with suppliers.” On the other hand, relatively few industrial firms stress the role of ICTs in increasing the firm’s strategic commercial and technical knowledge (reported to be “very important” by only 17% of enterprises).

Large firms differ from SMEs in that they expect ICTs to deliver more in the way of productivity gains. The expected gains can arise primarily from cost cutting (for 75% of large firms, versus 67% of the total sample), and from greater flexibility (73% of large firms compared with 67% of the total sample). More generally, 82% of large firms (versus 71% of the total sample).

### A ceteris paribus econometric analysis: the predominant role of the size of the enterprise

What are the most decisive factors in explaining the adoption of information and communication technologies (ICTs) by industrial enterprises? An econometric analysis using qualitative regression models can help to answer the question. The analysis was conducted using the Logit model, which examines the influence of individual variables, other things being equal, with respect to a reference situation.

For a given technology, differences in the penetration rate depend far more on the size of the firm than on the sector of activity; all sectors have invested in these information technologies. The larger the industrial firm, the greater its adoption of information technologies: irrespective of the type of system, the probability of its deployment increases strongly with the size of the enterprise.

Again assuming other things being equal, adoption is higher in firms that generate a large portion of revenues from export sales: firms are all the more open to new technologies when they are already open to external marketplaces. Similarly, the subsidiaries of corporate groups, and even more the subsidiaries of foreign groups, tend to have higher penetration rates than independent companies. Enterprises active in product innovation are also found to adopt these new technologies more frequently.

---

**Improving customer service, above all**

Nearly 50% of industrial enterprises—two-thirds of large firms—report that improving customer service is a “very important” objective in deploying ICTs. Mere product differentiation or improved product quality are no longer sufficient to achieve a competitive advantage. A reader way for enterprises to achieve a competitive advantage is by differentiating customer service in terms of quality and scope. Web sites provide interactive capabilities that make it possible to personalize the customer relationship and build customer loyalty.
Mounting difficulties in recruitment and training

While nearly 37% of industrial enterprises report few or no significant difficulties in deployment and use of ICTs, the other firms run up against obstacles, with 40% of firms reporting “significant” or “very significant” problems in this area. The main difficulties are recruiting specific competencies and personnel training, but also include the need to ensure compatibility among systems and homogeneity across the firm’s multiple locations.

In particular, firms report “very significant difficulties” in recruiting competencies (15.7%) and in training or redeploying personnel (11.5%). While the prime concern for SMEs remains training existing personnel in the new technologies, the biggest issue for large firms is most often hiring qualified personnel (25% of large firms consider this a “very significant difficulty,” i.e., 10 percentage points more than for SMEs).

Large firms are more advanced in ICTs, and they report “very significant difficulties” more often than other firms in ensuring system homogeneity across locations (20% versus 11%). Further, providing for system security entails “very significant difficulties” for 17% of large firms, compared with about 8% of SMEs. From their position in the vanguard of e-commerce and being more involved in B2B (particularly in international business), large firms express reservations regarding security for transactions, especially financial transactions, when conducted exclusively online.

On the other hand, large firms report fewer “very significant difficulties” than SMEs in finding tools adapted to the company’s needs and in ensuring compatibility of systems and hardware.

It was also found that industrial enterprises consider it difficult to evaluate return on investment in ICTs.

Paul FEUVRIER
Raymond HEITZMANN