How IT Shapes Top-Down and Bottom-Up Decision Making

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What determines whether decisions happen on the bottom, middle, or top rung of the corporate ladder? New research offers a surprising conclusion: The answer often lies in the technology that a company uses.

Information-based systems, such as Enterprise Resource Planning (ERP) software, will push decision-making toward the bottom of the corporate ladder. Communication systems, such as e-mail and instant messaging applications, will push the decision-making process toward the top.

And that means developing an IT strategy isn't all about deploying the best technology, says Raffaella Sadun, an assistant professor of strategy at Harvard Business School.

"If a CEO can trust his senior managers, he will be more willing to decentralize decision-making"

"The bottom line is that whoever is in charge of the acquisitions and the IT strategy, they obviously cannot just think about the technology side, they also have to think about the organizational side," she says. "Traditionally, technology is thought of as a tool that enables empowerment, but that's not always the case."

Sadun discusses the issue in "The Distinct Effects of Information Technology and Communication Technology on Firm Organization," a paper she cowrote with Nicholas Bloom of Stanford University and Luis Garicano and John Van Reenen of the Centre for Economic Performance, London School of Economics.

"Technologies that make the acquisition of information easier at the lower level of the hierarchy are associated with a decentralization of the decision-making process," Sadun says. "On the other hand, we have the communication technologies, which actually do exactly the opposite."

IT's different roles

Companies, however, often fail to consider the disparate roles of their software systems, let alone their effects on organizational behavior. Rather, they lump "information technology" into one amorphous idea—the "IT" department—which encompasses all the technology in the organization.

"Technology tends to be dumped into a single category," Sadun says. "The reality is that IT is a huge, heterogeneous set of technologies."

Similarly, when examining issues such as organization and productivity, industry and academic studies historically tend to treat information and communication technologies as "an aggregate homogeneous capital stock," according to the paper. To that end, Sadun and her fellow researchers set out to show how—and why—managers need to consider the very different organizational effects of communication and information technologies.

"This difference matters not just for firms' organization and productivity, but also in the labor market, as information access and communication technology changes can be expected to affect the wage distribution in opposite directions," their paper states.

The researchers looked at non-production decisions such as capital investment, new hires, and new product plans. Such decisions are either centralized near the top of the corporate ladder or decentralized and delegated to the top of a particular business unit. And the decision makers often depend on ERP software, which facilitates the dissemination of information throughout a large company, enabling detailed coordination among various operating units.

Next, they looked at production decisions, which involve figuring out the tasks necessary to meet the goals and deciding how to pace them. These decisions are generally the bailiwick of either a factory floor worker or a supervisor. For those cases, the researchers studied the role of Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM) software in decision-making.

In both instances, the researchers hypothesized that the information software would lead to decentralized decision-making. Because the software eases access to the information necessary to make important choices, both the ERP and CAD systems would increase the likelihood that plant managers and production workers would make decisions and act on them without having to consult an executive at headquarters.

On the other hand, the team hypothesized that a rise in leased lines and corporate intranets would lead to a rise in centralized decision-making at the top of the corporate ladder.

Enabling micromanagement

In the past, communication often depended on faxes, overnight delivery services, "snail mail," or site visits. Even with phone calls, it was difficult for anyone at headquarters to make educated decisions and communicate them to branch offices. In those cases, it was natural to cede control of daily operations to a local manager.

With today's networking technologies, it's easier for top executives to keep a constant flow of communication with branch offices. However, the network may actually deter innovation. When technology makes it easier to communicate, erstwhile independent workers may find themselves pestering their bosses with e-mailed questions throughout the day. Micromanaging executives find themselves making all the decisions and constantly sending mandates down the corporate ladder.

"Whenever there is a reduction in the cost of transmitting information, it's easier for the person down in the hierarchy to communicate with the CEO," Sadun says. "And the CEO can monitor constantly what this person is doing and just give orders, rather than rely on the judgment of those below."

The research team evaluated data from some 1,000 manufacturing firms in eight countries, including detailed technology rollout histories and surveys that gauged the relative decisional autonomy of plant managers and floor workers. (In gauging the factors that determine whether a firm adopts any given technology, the researchers considered geographic variables that might affect the cost of acquiring the technology—the firm's distance from the Walldorf, Germany, headquarters of ERP market leader SAP, for instance, and the fact that telecom industry regulations vary from country to country, which means networking prices vary, too.)

The findings were consistently parallel with the hypotheses: An increase in the penetration of ERP systems led to a substantial increase in plant manager autonomy. A CAD/CAM deployment raised the likelihood of floor worker autonomy. But communication technologies served to lower autonomy, meaning more decisions happened at the corporate level.

"I was reassured and surprised at the same time that these results were holding across countries and industries," Sadun says.

The importance of trust

That said, Sadun notes that technology is hardly the only factor that determines whether a firm allows decision-making both up and down the corporate ladder. Another major factor lies in cultural differences across and within countries. In a separate study, Sadun found that otherwise similar companies showed huge differences in decision-making tactics, according to their geographical location. In the paper "The Organization of Firms across Countries," coauthored with Bloom and Van Reenen, she documents that firms located in areas with high levels of trust tend to be systematically more decentralized than those in areas with low levels of trust.

Sweden and Portugal, for example, seem to be on opposite ends of the trust spectrum. "There's huge cross country heterogeneity in the way even apparently similar firms decide how to allocate decision rights within the firm," Sadun says. "Take Swedish manufacturing companies, for example. You see that they are completely decentralized, and the middle manager is basically a mini-CEO with loads of decision-making power. And then you take a firm that produces exactly the same good, but instead of in Sweden, it's in Portugal. And there, the middle manager doesn't decide anything and is completely dependent on the authority of the CEO.

"In our research," she continues, "we argue that different levels of trust are a key determinant of these differences. If a CEO can trust his senior managers, he will be more willing to decentralize decision-making. For example, there might be a lower concern about the fact that managers will use their power to pursue their personal interests instead of those of the firm."