The productivity paradox raised concerns that IT investment rarely leads to productivity gains [1]. End-user development (EUD), however, may provide the answer to this concern if increased productivity can be demonstrated. Recent research has questioned the productivity paradox and substantially improved our understanding about how IT productivity may be influenced by the manner of change.

Brynjolfsson and Hitt [1] argue that most of the IT productivity effects do not directly result from computer applications, but should be attributed to the process of appropriation in their organizational settings. Investments in the appropriation processes are a magnitude higher than those for the initial introduction of the hardware and software. Some studies suggest a ratio of up to 1:10 [2]. Empirical evidence also indicates that decentralized organizations, characterized by self-directed work teams, higher levels of individual decision authority, and better training, introduce IT more quickly and efficiently [1]. Following these observations, we believe EUD can decentralize the software adaptation and maintenance process. The empowerment of end users to tailor their applications will render appropriation processes more effective and thus lead to more economical IT investments.

Since the impact of IT productivity varies greatly across different firms [1], it is important to investigate organizational IT appropriations over longer periods of time. Orlikowski and Hofman [3] classify organizational transformations following the introduction of groupware along two dimensions: Whether the change is anticipated at the moment of the groupware introduction, and whether the transformation is planned and implemented purposefully.

“Anticipated changes” are organizational transformations, planned and implemented purposefully at the moment the groupware is introduced into the organization. In contrast, “opportunity-based” changes are not anticipated when introducing groupware. However, when their potential is discovered, these changes are implemented in a purposeful manner. “Emergent changes” are also not antici-
The empowerment of end users to tailor their applications will render appropriation processes more effective and thus lead to more economical IT investments.

Cost structure for software development, adaptation, and appropriation.

Since EUD-empowered changes are restricted to the scope of adaptation anticipated by the original designer, EUD can not fully replace the development of new software versions. Furthermore, developing software that can be adapted in its context of use is expensive. It demands more effort for generalizing requirements analysis, design of evolvable architecture, and flexible interface design. However, the additional effort can result in better software quality and payoff in the creation of enhanced software solutions.

The accompanying figure illustrates the cost structure for software development, adaptation, and organizational appropriation. The initial cost of software development is typically more expensive when realizing an EUD environment; however, EUD subsequently lowers the costs of adaptation and encourages the exploitation of opportunities for organizational appropriation. Given the ratio between costs in software and its organizational appropriation, EUD has a considerable potential to enhance the productivity of IT investments.

The accompanying figure illustrates the cost structure for software development, adaptation, and organizational appropriation. The initial cost of software development is typically more expensive when realizing an EUD environment; however, EUD subsequently lowers the costs of adaptation and encourages the exploitation of opportunities for organizational appropriation. Given the ratio between costs in software and its organizational appropriation, EUD has a considerable potential to enhance the productivity of IT investments.

REFERENCES


Volker Wulf (wulf@fb5.uni-siegen.de) is an associate professor at the University of Siegen and a senior researcher at Fraunhofer Institute for Applied Information Technology (FhG-FIT). He also heads the International Institute for Socio-Informatics (IISI), Bonn, Germany.

Matthias Jarke (matthias.jarke@fit.fraunhofer.de) is a professor of information systems at RWTH Aachen University and director of the Fraunhofer Institute for Applied Information Technology, Sankt Augustin, Germany.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.