CIRANO
Knowledge into action

EXTRACTING VALUE FROM INFORMATION TECHNOLOGIES

CIRANO Note, prepared by Benoit Aubert and Blaize Reich, April 2009

Introduction

Understanding the relationship between information technology (IT) investments and productivity has been a challenge for researchers and a debated topic for managers and policy makers.

In CIRANO's Burgundy Report *Extracting Value from Information Technologies*, the authors review the relevant research on IT and productivity, and try to identify the conditions under which IT does have a positive contribution. They also pay particular attention to project level actions that members of the governance team can take to increase their chances of a successful project.

Impacts of IT

One challenge when trying to explain the link between IT and productivity is the constant challenge associated with the implementation of IT in organizations. Companies are too often reporting massive cost increases or large delays for their IT ventures. Sometimes they cancel projects after having spent millions of dollars. Anyone familiar with the conduct of IT projects knows a few examples of projects that did not unfold as expected. Yet, companies keep investing in IT, suggesting that there are major expected benefits.

In order to understand the role of IT in our economy, we have to look at several facets of IT investments. First, it is important to assess the global picture, looking at IT in the overall economy. It is also important to assess how IT might have contributed to changes in specific industries. At a more detailed level, we must understand how IT is used in organizations, how it is transforming them, and how it is managed at the project level. Combining these different perspectives enables a proper assessment of the contribution of information technology to our productivity.

Impact at the global level

Results show that the IT to productivity relationship is neither linear nor simple. At the national level, many studies found a link between IT investments and productivity. However, several puzzles remain. First, it is not clear that IT represents a more productive investment than other assets. Second, the irregular relationship between IT investments and productivity gains, for example the apparent disconnect between IT investments and productivity in the UK, while similar investments in the USA were fruitful, remains to be explained.

The contribution of IT to productivity seems stronger in specific sectors. The sectors benefiting from gains were mostly high information intensity sectors, such as financial services and retail.

The contribution of IT to productivity was particularly strong during the period 1995–2000. Most studies consider IT to be the main source of productivity growth in the second half of the 90s. This eventually gave rise to some assumptions regarding the historical impact of IT. Some authors maintain the existence of two distinct periods, one characterized by a significant and positive impact of IT on productivity (1995–2000); the other characterized by a lack of such impact (all years prior to 1995). Some attribute this discrepancy to a lag in the impact of IT implementation on businesses or to the influence of the Internet, which started up in the early 1990s but truly came into its own in the mid-1990s.

Impact at the organizational level

When assessing the impact of IT at the firm level, results vary from very positive to disastrous. The variety of goals behind IT implementation might explain the variety of results. Also, it appears that some firms are clearly better than others at extracting benefits from their IT investments. IT is not a silver bullet. It entails risks and requires specific skill sets in order to generate benefits. The gap between failed projects, which result in losses of investment, opportunity and confidence, and successful projects, which contribute significantly to organizational success and build momentum, is very great.

The investigation of research at the project level shows some of the obstacles between IT investments and increased productivity. Some studies have shown that the success of a project is conditional on several factors intrinsic to the firm, including its commitment to change or simply attitudes toward the project. For increased productivity, projects have to be brought to completion in order to generate gains. This is a first hurdle. Second, results suggest that complementary investments made in parallel with the IT investments are required for IT to generate substantial benefits. These investments in training, business reorganization, and new knowledge are necessary to enable the firm to take advantage of the technology.

Lessons for managers

At the executive level, several responsibilities are essential for IT investments to succeed. Executives have to assess the overall situation and ensure that resources freed by the introduction of technology are reallocated profitably for the organization. They are the ultimate architect for the business changes introduced in the organization. They have to ensure that the configuration of assets (IT being only one type) will be appropriate to ensure the future of the organization.

Conclusion

IT can have a substantial contribution to productivity. However, for IT to generate significant benefits, it has to be well understood and well managed. IT can generate benefits when it is implemented along with additional investments, mostly in the form of knowledge and business reorganization. The absence of these investments in many instances might explain the unsteady contribution of IT to productivity observed in different studies. In order to extract these benefits, IT and business managers, as well as the executives of the organization, have to coordinate their actions.

The complete Burgundy Report is available at:
http://www.cirano.qc.ca/pdf/publication/2009RB-04.pdf