

Foundations of Information Economics – Part III

Paul Strassmann continues his series of insights into the nature of information economics

For information economics to be of use it must deal with a recent and widely publicised denial of the principal assumptions that have governed the conduct of IT over the past 50 years. Are the following ten propositions true or false?

1. IT is a commodity that does not offer a competitive distinction and therefore is not a competitive advantage;
2. IT is an infrastructural technology easily acquired and copied by anyone. Thus it cannot offer a competitive advantage;
3. The influence of IT will henceforth be macroeconomic, and not a means for competitive differentiation;
4. IT is primarily a transport technology open to everyone and offering no advantage;
5. IT functions will be homogenised, thereby dooming proprietary applications that differentiate firms;
6. Corporations will adopt generic applications, thus making business processes uniform and without competitive advantage;
7. Existing IT capabilities are largely sufficient for corporate needs;
8. Widespread adoption of “best practices” software makes IT-based advantages disappear for everyone;
9. IT technology is reaching the end of its growth cycle and reaching saturation;
10. IT risks now exceed advantages, requiring shifts in executive attention.

Information Productivity of firms shows approximately an equal number of winners and losers

Nicholas Carr published the above assertions in the May 2004 issue of the *Harvard Business Review*. Carr offered a view of the future of IT in which it becomes economically irrelevant. According to the New York Times, “...Carr lays out the simple truths of the economics of information technology in a lucid way...”.

There has been a deluge of claims and counter-claims about the credibility of what could be construed as Carr’s obituary of IT. The problem with all such debates has been their inability to either support or refute Carr with rigorous analysis. Carr offered an ephemeral target to aim at because his position was based on argumentation by analogy – a favorite technique of Aristotelian logic – in which any proposition is true as long as it does not end up in a logical contradiction. Without offering any data that would qualify as economics I saw no point in debating his propositions.

In the sciences a theory can be maintained only if it is in agreement with facts and if there is no evidence that would refute it. This restricts the discretion to propose new theories. A hypothesis has to be dropped when verifiable data

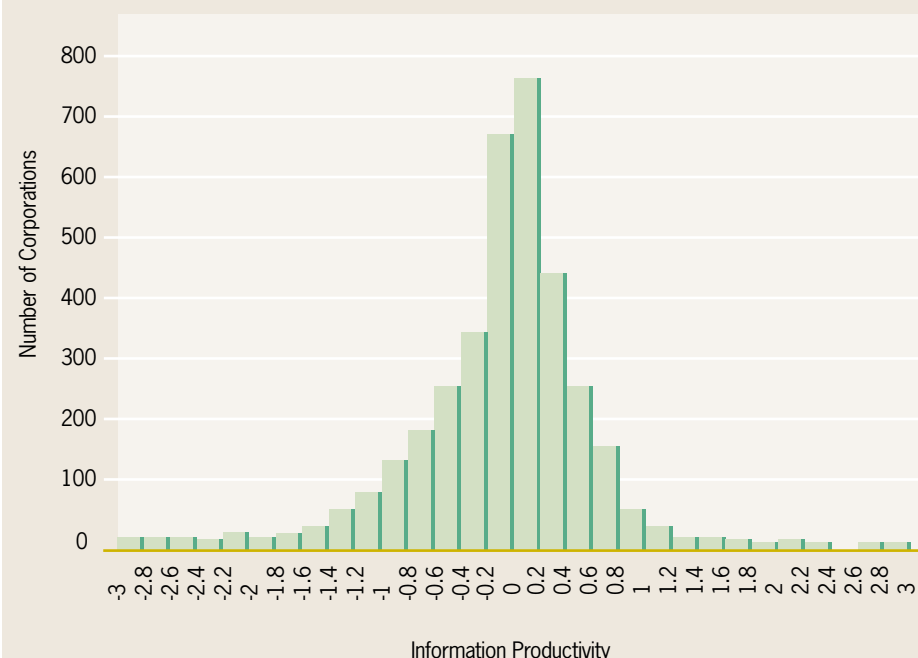
contradicts it. As I see it, the mission of information economics is to shift much of the discussions about Carr’s view from verbal argumentation to facts.

Evidence

I propose to show that despite the widespread deployment of computers and despite the similarity of IT technologies a “homogenisation of corporate performance” has not taken place. As far as I can see that is not likely to happen. Though there has been widespread availability of advice how to apply “best practices”, corporations suffer from wide ranges in profitability. Carr’s theory does not hold up because IT cannot become irrelevant when economic losers compete with increasingly aggressive winners using every available means to improve their position.

As in warfare, possession of armaments does not assure victory. Nevertheless, in an arms race one cannot fall behind in using the best available technologies. In a contest between medieval pikes and muskets, the musket was always the winner. In a contest with muskets, the bolt-action rifle always wins. The losers have no choice except to continue arming themselves with the best weapons they can get. Nowadays, with transaction costs becoming the key differentiators in global

FIGURE 1: Distribution of Information Productivity for 3,903 US Firms



The year-to-year ranking of individual firms changes as Information Productivity is gained or lost from competitive actions

competitive confrontations (see my prior IEJ articles), IT has become the weapon of choice in commerce.

To gather evidence about the status of competition we will use Information Productivity®, defined as the ratio of Information Value-Added (defined as the Output of a firm) divided by Information Transaction Costs (defined as the

workforce, which includes executives, managers, administrators, clerical staffs, researchers, salespeople, and technicians. It is this population that would benefit from IT support.

I have been tracking Information Productivity (IP) of US listed corporations for more than 12 years through boom and bust. The latest distribution of

were clustered in the IP range from 0% to 20%.

To offer a better understanding how Information Value-Added is calculated (e.g. Income Before Extra Items minus Capital Asset Pricing x Shareholder Equity), overleaf is a table showing 2003 results for a sample of leading UK firms, in US\$ millions.

I have compiled similar tables for Canadian and several leading EU firms. I have also tracked comparisons of US firms over several years. This leads to the sixteenth “law of information economics”:

16. The distribution of Information Productivity winners and losers does not change over time or by national origin.

From a statistical point of view the distribution of Information Productivity can be characterised as negatively skewed, favoring a slightly lower median during economic recessions and moving up (but only slightly) for favourable economic conditions. Regardless of the year-to-year variations the reality is that more firms are under-performing than over-performing! Since IT must be always considered as one of the principal means when making moves to lifting a firm from a negative IP to positive values, IT cannot possibly be irrelevant.

The distribution of Information Productivity winners and losers does not change over time or by national origin

residual input of a firm after all direct costs and the cost of capital have been paid for).

Differences in corporate profits can be attributed to many causes, such as advantages in costs of labour, lower costs of capital, circumstances that favour the deployment of cheaper assets, tax advantages, and so forth. By focusing exclusively on a metric that uses Information Value-Added, we have eliminated all of the other economic factors except for information management. In this context “information management” includes the expenses for the information

IP values for 2003 (the latest period for which full financial results are available for 3,903 firms) are shown as Figure 1, above.

The distribution of the value of IP firms in Figure 1 reflects the fifteenth “law of information economics”:

15. Information Productivity of firms shows approximately an equal number of winners and losers.

There were 1,729 firms with positive values of IP ranging from 0% to 892% and there were 2,174 firms with negative values of IP ranging from 0% to -972%. 776 firms, the largest number in the sample,

There will be no universal IT infrastructure because each firm must architect its own IT to support unique competitive initiatives

This finding refutes one the arguments offered by Carr. Far from uniformity, the actual financial results show an enormous diversity. For instance, among the highest-ranking firms in Figure 2 are two banks. It also happens that a bank is found among the lowest ranking firms. From the standpoint of IT usage one would not find a material difference in the mainframe, desktop, display, or printer technologies used by any of these banks. If the bank Abbey generates much lower Information Value-Added (as well as Information Productivity) than either Lloyds TSB or Barclays that cannot be brushed off as IT irrelevancy. With IT representing the single largest cost center in banking Abbey must use IT as one of the means for scoring gains in Information Productivity.

The above conclusion leads us to the seventeenth “law of information economics”:

17. The year-to-year ranking of individual firms changes as Information Productivity is gained or lost from competitive actions.

Competition for market share forces smaller firms to pursue growth aggressively. Leading firms must defend their positions whenever they are challenged, not only from domestics but also from global competitors.

A small sample of competitive positioning, in an identical business, is displayed as Figure 3.

Much of the lower Information Productivity ranking for Shire

FIGURE 2: Top and Bottom Ranking UK Firms, by Information Value-Added

Company Name	Business	Income Bef Extra Items	Capital Asset Pricing – %	Stockholders' Equity/Pricing	Information Value added
GlaxoSmithKline	Pharmaceutical Preparations	\$8,022	\$3	\$13,774	\$7,574
BP	Petroleum Refining	\$10,267	\$7	\$75,938	\$4,912
Lloyds TSB Group	Commercial Banks	\$5,806	\$11	\$17,171	\$3,956
BT Group	Radiotelephone/Comm	\$4,241	\$15	\$4,172	\$3,634
Shell Tran & Trade	Petroleum Refining	\$4,896	\$8	\$29,139	\$2,452
AstraZeneca	Pharmaceutical Preparations	\$3,036	\$6	\$13,178	\$2,220
Barclays England	Commercial Banks	\$4,896	\$9	\$29,391	\$2,214
Unilever	Food & Kindred Products	\$990	\$1	\$-1,195	\$1,004
BG Group	Natural Gas Transmission	\$1,370	\$6	\$7,003	\$967
Anglo American	Metal Mining	\$1,592	\$12	\$20,394	\$-788
WPP Group	Advertising Agencies	\$372	\$17	\$7,172	\$-817
Pearson	Books; Pubg, Pubg & Printing	\$98	\$18	\$5,267	\$-834
BAE Systems	Aircraft	\$11	\$10	\$9,975	\$-949
AMVESCAP	Investment Advice	\$-31	\$25	\$3,983	\$-1,016
Abbey National	Commercial Banks	\$-1,247	\$1	\$9,512	\$-1,352
British Energy	Electric Services	\$-6,223	\$9	\$-5,342	\$-5,720
Cable & Wireless	Radiotelephone	\$-10,316	\$17	\$3,393	\$-10,893
MM02	Radiotelephone/Comm	\$-16,024	\$18	\$15,894	\$-18,944
Vodafone Group	Radiotelephone/Comm	\$-15,504	\$10	\$203,172	\$-35,890

The primary objective of an IT infrastructure is to support gains in a firm's Knowledge Capital. Every competitive scenario will call for superior business intelligence in executing competitive moves

Pharmaceuticals can be explained by unfavourably high ratios of Transaction Costs / Cost of Goods as well as Transaction Costs / Employee. To improve Information Productivity these two ratios need to be brought in line with leading competitors, unless other means are available to achieve superior Information Value-Added. Any such move would have to involve deployments of IT to enhance competitiveness. Cutting IT budgets cannot possibly double the Information Productivity of Shire Pharmaceuticals.

Future Trends

As seen from the standpoint of

information economics the following five laws are then likely to steer the conduct of IT:

18. Large gaps between productivity winners and productivity losers will stimulate exploitation of every conceivable advantage from IT.

With the expansion in the global supply chains for goods and services, every firm will seek the integration of suppliers as well as customers into its logistics framework. Large corporations, with huge purchasing power, will have an advantage in achieving such integration. With technological innovations, such as grid computing and standardisation in data

FIGURE 3: Information Productivity Ranking of Three Pharmaceutical Firms

Company Name	Cost of Goods US\$-M	Transaction Costs US\$-M	Employees (000s)	Information Productivity -%	Transaction Costs/Cost of Goods -%	Transaction Costs Employees – US\$000s
GlaxoSmithKline	\$5,938	\$19,214	103.166	39.4%	323.6%	\$186
AstraZeneca	\$3,179	\$10,469	61.9	21.2%	329.3%	\$169
Shire Pharmaceuticals	\$121	\$679	1.814	15.7%	563%	\$375

Competition among species dictates that survivors occupy unique ecological niches. Natural competition promotes variety, not uniformity

Competitive tensions, on a global scale, propel IT innovations at an accelerated rate. Rising inequality places greater importance on information as the most effective means for improving productivity

formats, smaller firms will tend to adopt more flexible solutions and turn their specialised capabilities to their advantage. It is the race between large firms and small enterprises that will ignite IT based competition on an unprecedented scale.

19. There will be no universal IT infrastructure because each firm must architect its own IT to support unique competitive initiatives.

A proliferation of low cost information service offerings, based on successors to the Internet, will make it possible for firms to adopt outsourcing of most of their IT functions. However, firms will retain essential tasks such as systems architecture and systems integration. Thus freed from the onerous tasks of systems maintenance, new energies will be devoted to competitive innovation and to improved responsiveness to business needs. This environment will stimulate the growth in the importance of IT to satisfy rapidly changing customer preferences.

20. The primary objective of an IT infrastructure is to support gains in a firm's Knowledge Capital. Every competitive scenario will call for superior Business Intelligence in executing competitive moves.

Competition will shift IT from intra-firm business process management to dealing with external opportunities and in countering information-based threats, which includes protection against theft of information assets. As competition sharpens, the capacity to react to external developments will depend on the capacity to own and operate Business Intelligence systems. Any firm already at a disadvantage in Information Productivity, is likely to lose its capacity to recover altogether if confronted with unanticipated challenges.

21. Competition among species dictates that survivors occupy unique ecological niches. Natural competition promotes variety, not uniformity.

Easy access to information technologies and the rapid spread of knowledge how to use IT will stimulate niche markets. There is a huge population now entering into the global workforce that will seek support to displace over-priced information-based services, such as in Government, health, education, social services, and entertainment. Innovative IT services will have to match the enormous diversity in human culture and personal habits.

22. Competitive tensions, on a

global scale, propel IT innovations at an accelerated rate. Rising inequality places greater importance on information as the most effective means for improving productivity.

IT has the capacity to mitigate the disadvantages arising from a costly workforce, from poor access to natural resources, from excessive dependence on capital, or from organisational complexity. In an era of steady increases in the prices of labour, land, materials, and energy, IT will tend to be the least expensive resource that can be deployed to alleviate all other disadvantages. That is why demand for IT will have to rise.

Summary

The world of corporate IT continues to be characterised by a large number of losers in information-based competition. Every firm with a persistently negative Information Productivity is threatened by failure. Such conditions suggest that the pressure for generating IT contributions to business productivity will increase. IT will be in the forefront of assuring competitive survival. The future is seen as one of evolutionary turmoil, variety and change and not one of stagnation ■

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Paul Strassmann is a renowned Information Economy analyst