Why IT Continues to Matter: Reflections on the Strategic Value of IT

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Abstract: In May 2003 an article by the former editor of the Harvard Business Review (HBR), Nicholas Carr, in HBR, suggested that IT was no longer a strategic concern for management and that investments in IT should, in future, be restricted to the routine. Carr's thesis has been widely debated, not least in the context of IT value in general and its strategic value in particular. Notwithstanding flaws in his reasoning, this short nine-page article appears to have had a significant impact and influence on the way chief executives think about IT, and has had real consequences for IT budgets, not to mention careers. Carr went on to develop his ideas in a subsequent book. This article examines Carr's arguments at a number of levels and suggests that it would be unwise to base long-term thinking about IT on his conclusions.

Keywords: IT value; strategic value; technology value; strategy; innovation

1. Introduction

> *Everything's up-to-date in Kansas City. They've gone about as fur as they c'n go.*
> (Oscar Hammerstein II in Oklahoma).

Nicholas Carr's announcement that IT does not matter any more first appeared in the Harvard Business Review (HBR) in May 2003 (Carr 2003). It immediately ignited an acrimonious debate with vendors, users, practitioners, commentators and academics rushing into print to take sides (see, below). Carr followed up the HBR paper with a book (Carr 2004), which essentially reworked the arguments of the earlier paper at greater length and contained several more detailed examples. Carr summed up his fourfold recipe for IT strategy towards the end of this book as:

- spend less,
- follow, don't lead,
- invest only when risks are low and
- focus on vulnerabilities rather than opportunities.

Implicit in these nostrums is the concept that IT adds strategic value only at the margins and that any direct competitive advantage gained from IT is quickly eroded, or indeed trumped by second and later movers who avoid the risks and costs of bleeding edge technology. Put coldly, IT is not sufficiently strategic any more to justify large investment or risk.

Carr was not, of course, the first person to question the long-term value of ICT. There had been other attacks, notably by economists like Solow[1] and Roach[2]. Carr also invoked Strassman's (1997) and others' findings that there was no correlation between IT spend and business performance. To be fair, Carr does not suggest, as some economists have implied, that IT is unimportant. On the contrary, he stresses that IT, like electricity, is essential to business, but it is just another thing to be routinely managed. "*IT management*" he wrote in the HBR paper, "*should, frankly, become boring*" (Carr 2003, p49). The real surprise was that, unlike previous indictments of IT spending, Carr's paper seems to have had a material impact on IT stakeholders' behaviour, despite the fact that the empirical evidence supporting his assertions is open to challenge at several levels. The degree of impact achieved by Carr's original paper may, at least in part, have been because of where it was published and/or because of Carr's skilful use of rhetoric. Some chief executives took the message on board and began to question strategic investments in ICT although more recent evidence suggests that this effect may have been temporary[3]. Some IT community leaders came to his defence (Lewis 2003; Hittleman 2003; Skaistis 2003); others sought to fillet his arguments (Brown and Hegel III 2003; Broadbent, McDonald and Hunter 2003).

This paper looks at one implication of Carr's argument, namely that IT is not of strategic importance any more. It assesses the validity of this conclusion, first by a conceptual exploration of the nature of the strategic value of technology in general and then of IT in particular. To do this, the

[1] Cited in http://www.brookings.edu/views/articles/triplett/199904.htm . Robert Solow's statement was "You can see the computer age everywhere but in the productivity statistics." And is now sometimes referred to as the Solow Paradox.

[2] Cited in http://www.misq.org/archivist/vol/no18/issue2/edstat.html

[3] See "The End of Corporate IT? Not Quite" at www.computerworld.com/managementtopics/management/itspending/story/0,10801,102616,00.html

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question of what is meant by 'strategic value' will be explored. It will be shown that, apart from being something that yields (reasonably long term) competitive advantage, this expression has several other possible interpretations. Examples of how other types of strategic value can be delivered by a technology will be examined. Finally the question of how IT fits into this picture will be discussed.

Before embarking on this it is useful to review Carr's argument and the responses to it. As already noted, it is possible to take issue with Carr's argument on many fronts and at many levels. It will be argued that, notwithstanding his critics and weaknesses in his method of reasoning, that there may in fact be something useful in what Carr says, but that, that something is probably not what he intended to say. This will serve as a platform for the exploration of the concept of strategic value.

2. Carr's proposition

Many readers will be familiar with Carr's article, but for those who are not, a summary follows. Carr argues that emergent technologies may offer opportunities to those who can exploit them effectively in the early stages of their development. There are various reasons for this including that:

- the technology is expensive, so not everybody can afford it,
- not everybody will be sufficiently imaginative to see its potential immediately,
- those who exploit it early may be able to lock-in customers, markets or business in a way that is difficult for others to break or match.

Unfortunately, over time, these advantages fade and often quickly. As more vendors of the technology compete for market share, prices fall, sometime precipitously. Next, the technology, which in its early stages may have many variants, becomes standardised. It also becomes more reliable and easier to use. Sooner or later it becomes commodity-like. The cost of imitation and/or replication falls. Late arrivals, if they get their timing right, may be able to skip technology generations, leaving older players with large investments in legacy systems trailing in their wake. What was yesterday's cutting edge application becomes today's standard offering and all too soon becomes yesterday's dinosaur. Expertise, formerly precious and expensive, becomes commonplace. Eventually everybody either has the technology in place or can buy it in the high street.

Carr summarises the path of new technology as being in four phases:

- The initial stage when the technology is new, raw and not well understood,
- The build-out stage during which an increasing number of companies acquire the technology,
- The infrastructure stage where rationalisation and standardisation occur and,
- The commodity stage where the technology is inexpensive and ubiquitous.

IT, he proposes, has now emerged from the third of these stages and is well into the fourth.

Carr supports his argument in a number of ways. He draws analogies with the railway, telegraph and electricity supply systems. He points to the failure of many IT projects and the difficulties in showing strategic advantage from IT investments. He argues that standards, interchangeable components, mobile and available skills, packaged software and so on level the playing field. Managing IT is not necessarily easy, but it is no longer a bet-the-company game[4] any more than running the finance or marketing departments is. Ultimately, a good CIO should be able to put him- or her out of a job. Companies should no more need an IT manager than they need a gas or water manager. As a result, the special status given to IT, especially in terms of scarce investment funding, should be rescinded. Processing power, Carr claims, now largely outstrips business needs and communications and storage capacity will so do soon. Capacity has caught up with demand and, as a consequence, in the vendor markets, only the fittest will survive and then with commodity products. Nobody believes the hype any more[5].

For CIOs this reads like a recipe for at best boredom, at worse career stagnation. To CEOs it sounds like an invitation for dramatic cost cutting.

3. Flaws in the argument

As noted above, the response to Carr's paper was immediate and vigorous. One line of attack was on the style of the argument. Academics and commentators pointed out that much of the argument is rhetorical and relies on nothing more than analogy, Strassmann (2003, p7) commenting that:

> *"…Any proof that rest entirely on analogies is flawed"*

Others claimed that Carr relied on carefully chosen examples, selective use of statistics and the assumption that, in terms of its impact on busi-

[4] IT was rarely a *bet-the-company game*. If it was such, then IT was almost certainly being implemented poorly.
[5] There is little evidence to support any of these assertions and what evidence there is is purely anecdotal.

ness and society, one technology is essentially similar in behaviour to another (a variation of the analogy argument).

Even a casual study of the text shows that much of Carr's argument is rhetorical rather than substantial. To be balanced, it must be said that some academics showed that they themselves were no slouches when it came to the well-honed barb. McFarlan and Nolan (2003, p5) did not mince words when they wrote:

> *"The most dangerous advice to CEOs comes has come from people who have either no idea what they did not know, or from those who pretended to know what they didn't. Couple not knowing what you don't know with fuzzy logic and you have the makings of Nicholas Carr's article".*

Invective such as this does not actually contribute to understanding of the argument, entertaining though it may be.

A good example of Carr's use of the rhetorical flourish is his observation that discoveries made in the 20th century, including IT, are of much less importance than those made in the 19th. "*Which would you rather do without your computer or your toilet,*[6]*"* he asks (Carr 2004, p141)? This style of argument seems convincing until one realises that it misses, or to be more accurate, elides the point. While, on a day-to-day basis, indoor plumbing is undoubtedly more important to more people than, say, antibiotics or jet engines, the impact of the latter two technologies has been enormous in changing the way we think and the way we behave with regards the nature of health and our attitude to travel and global society. The comparison has, as Ko-Ko[7] might well say, nothing to do with the case – it is a smoke screen.

Carr's argument by analogy also breaks down, even where it does not miss the point, because it is pushed to far. For example, there are many differences between IT and railroads. The speed and the reliability of rail transport has hardly changed in 100 years[8], whereas computers and communications are not only still getting faster, but much more reliable, more capable, easier to manage, more flexible and so on. Railways remain highly capital intensive; IT systems may have been in the early stages, but are not so any more. Railways only do one thing, transport people and goods. IT can do an amazing range of things from controlling the central heating system to modelling earthquakes. Electricity is a better analogy if one takes it as equivalent to, say, pure processing power or bandwidth. But, as will be argued below, it is what you can do with electricity that matters, just as it is what you can do with IT that is important. Furthermore, nothing in any of the analogous technologies which Carr discusses is comparable to software. Software may be the most significant material of the 21st century in terms of what can be done with it. So the analogies are suspect to say the least. Carr does not quite overlook this point, but he chooses (or maybe prefers) not to confront its implications head on. This is probably the central weakness in his argument. By making the same simplified point several times, Carr's case, his critics might claim, amounts to little more than the well-worn undergraduate technique of proof by re-iterated assertion.

4. In defence of Carr: The empirical evidence

From the above it can be seen that those who wished to were soon able to convince themselves that Carr was all style and no substance[9]. But there were those in the academic community felt that some of Carr's conclusions had certain validity, even if the reasoning behind them was flawed. Carr himself had cited various examples in his article and book, but, even allowing for the dot.com crash, there was empirical evidence, which suggested that IT was not commanding the amount of attention or concern by corporate leaders, which it had a decade earlier. This evidence included:

- The slow recovery in IT spend after its precipitous collapse following the dot.com crash[10]. While it would not be reasonable to expect IT spend to recover to the exceptional levels that they achieved at the height of the boom, the size of IT budgets (see, for example, Gomolski 2004) suggest that IT is getting a lower priority that it did in the past;
- The growth in IT outsourcing. Outsourcing is a much wider phenomenon than IT and there are many reasons why companies adopt this strategy, but IT outsourcing is now big business. Amongst the normal prerequisites for

[6] In one form or another toilets have been around since ancient times. The ancient Romans were particularly good at designing them. Carr is probably referring to the siphonic flushing version.

[7] The Lord High Executioner in Gilbert and Sullivan's comic opera, *The Mikado*.

[8] Apart from exceptions such as the TGV in France and the Bullet Train in Japan, but even these only increased speed by a factor of about three.

[9] Not that this was unimportant, as Oscar Wilde once observed, "*In matters of great importance, style not substance is a vital thing*" (Wilde (1995))

[10] It is true that the bursting of the e-Bubble began in 2000 which also corresponded with the disappearance of the Y2K anxieties which accounted for the exceptionally large corporate spend in IT in the previous five years.

outsourcing any function or operation is that it is not strategic. Smart companies do not (or at least should not) outsource control of their key technologies (Fingleton 1999, Chapman and Andrade 1997). Given that so much IT is now being outsourced, the conclusion must be that companies do not see it as a strategic asset;

- The parallel and continuing non-recovery in the number of students taking IT and IS related courses[11] It is not that the views of 17-18 year olds on the future of IT is indicative of the strategic value of IT, but they are influenced by a variety of other factors, including parents and tales of woe from the industry. In this sense, their course choices are a proxy for the wider world;
- The fall in the share prices of leading players in the IT market. From time to time there are start-ups with spectacular rises in most industries, but the spectacle of many such organisations are typical of emergent industries based on new technologies. As the industry matures, so does the share price behaviour of its former *enfants terrible*. The share prices of companies like Intel, Microsoft and Cisco now tend to move with the market. As companies, they might now be described as 'ex-growth'. This can be interpreted as a sign of technology as well as corporate maturity;
- A further indicator is when IT companies start to return cash to investors rather than holding it for re-investment. In 2004, Microsoft announced plans to return $75 billion of cash to shareholders (Cronin 2005). This is generally indicative of a view that the company cannot find a more productive use for the money;
- The extension of hardware operating lifecycles. Firm evidence for this is more is hard to come by, but it is widely accepted as being true (Doms 2004). Fifteen years ago, a PC had a useful business life expectancy of a little over two years. Today, most companies probably expect to get four or more years out of a machine. This is supporting evidence for the assertion that the power of PCs is now more than adequate for most business needs;
- The same is true in a subtly different ways of software. As Microsoft has moved from Windows 95 to 98 to 2000 to XP to, it is presumed, Vista, the willingness of organisations to pay for major upgrades is fading and the time between major changes is lengthening. There is now considerable inertia in software systems and adding new features is becoming progressively more difficult as the law of diminishing returns kicks in.

None of the above makes a conclusive case for the proposition that IT is loosing its importance, but together they suggest that there may be more to Carr's argument than some of his critics are willing to concede. Put another way, the direct evidence that IT is not of strategic importance any more may not be convincing, but there is circumstantial evidence to suggest that the problems with the IT industry are worth a closer examination.

5. The strategic value of technology

Few words in the business lexicon are more problematic than 'strategy'. Ghemawat (1997) points out how its meaning, originally derived from an ancient Greek word for magistrate, has changed and evolved, first within the military environment and later, at least since the 19th century, in the business world. Many attempts have been made to define strategy, but there has been little consensus as to which definition is the most satisfactory. Chandler (1962, p13) suggests that strategy is:

> *"the determination of the basic long term goals and objectives of the enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out these goals".*

Ansoff (1965) in his influential book suggests that strategic decisions are primarily concerned with external, rather than internal, problems of the firm and especially with selection of the product mix. Porter (1980) develops this point saying that the essence of strategy formulation lies in relating a company to its external environment. Kay (1993) contends that the strategy of a firm resides in the match between its internal capabilities and its external relationships, that is in how it responds to its suppliers, its customers, its competitors and the social and economic environment in which it operates. There are subtle differences between these which Hambrick and Fredrickson (2001, p50) try to synthesise by defining strategy to be:

> *"… the central, integrated, externally oriented concept of how we will achieve our objectives".*

Elegant though this definition is, it too is problematic. The main difficulty with it is that it is easy to lose sight of the fact that strategy not only concerns customers, but also suppliers and other aspects of the economic environment such as technology and government policy. Strategy is truly an overarching concept. Moreover, the adjective 'strategic' frequently has a different nuance from the noun from which it is derived. According to

[11] In Ireland, applications for IT related third level courses dropped by 26% in 2002 and have further declined since, much to the current benefit of those who did IT courses (Clark 2005)

Hambrick and Frederickson, the elements of strategy for a company are:

- Which arenas/markets does it wants to be in?
- How will it get there?
- How will it differentiate itself?
- How fast will it try to achieve its objectives?
- How does it make this process profitable?

If one looks at these questions through a technology lens, problems quickly become evident. To take one at random. 'How will we get there?' encompasses the question 'what technology will we use to get there?'. Even if that technology is basic and well established, it is still part of the strategy. Is such a technology therefore strategic? In practice 'strategy' and 'strategic' are protean words, cable of changing meaning with context. There is no definitive definition.

To make matters even more complicated, within the world of IT, the term 'strategic value' is often used casually as if its meaning was self evident. In the world of information technology, it is most commonly discussed in terms of direct competitive advantage or, less frequently, survival (Porter 1980, 1985; Porter and Millar 1985). The logic has been repeated *ad nauseam*: competitive advantage enables an organisation to thrive at the expense of its competitors by offering a new or better product, better service, lower cost and so on. This notion has been leveraged extensively in marketing IT, both to and within organisations. Carr's critique is largely of what might be called first mover advantage. A goodly part of his article and book are dedicated to attacking the value delivered by such advantage. In contrast, Carr is relatively silent on the relationship between incremental improvement and IT. These are distinctly different ways of using IT for competitive advantage.

However, technologies can offer strategic value without necessarily doing this by creating direct competitive advantage. In the following section, several alternative views of the meaning of strategic IT value are presented. To help generalise the concept, these will first be discussed in terms of non-information related technologies. In the subsequent section, how IT fits into this framework will be considered.

Direct competitive advantage apart, possible interpretations of *technology based strategic value* are:

- Strategic value as fundamental to the organisation's business/industry. A technology, which underpins the operation of a company, can be regarded as strategic. The technology concerned does not have to be part of that industry; it can come from outside. For example, the technology of extracting and refining oil is strategic to the automotive industry in this manner. While there are ways that vehicles can be powered other than by hydrocarbons, it is likely that the car industry would be a very different one were petrol and diesel and the infrastructure that delivers them to the point of sale, not available.
- Strategic value as long-term value. A technology may be said to be strategic if it directly influences or governs the future of the organisation. This may mean that it will only pay off over the longer term[12]. That in turn means that in the shorter term the benefits may be negligible or that in its early stages the technology may cost more than it yields, but over time the cost/benefit equation reverses. This is a common phenomenon with new technology. A contemporary example is alternative energy. Up to now, returns on wind-farms have been poor and dependent on government support, but in the long term as the price of oil rises, such investments are likely to yield a positive return. In this sense, they have strategic value.
- Strategic value as a driver of or platform for change of direction. A technology may have value in that it enables an organisation to change direction or develop in new ways. The invention of jet propulsion and later, new metal alloys and composite materials has facilitated the enormous growth in air travel and transformed that industry and the companies in it in the process. Another good example is the 3M Corporation, which started out making sandpaper and, with the invention of masking tape, changed direction in the 1920s to become a world leader in adhesives technology[13].
- Strategic value as necessary for survival. A fourth interpretation is that a technology may necessary for an organisation to survive at all. There are several reasons why this may be so, not least that customers demand it and a business that does not supply it is not going to last long. A technology may also been essential to meeting regulatory requirements. The catalytic converter is a simple technology that is essential to staying in the automotive market. Another example is the development of alternatives to hydroflurocarbons as propellants.

[12] A common error is to equate the word 'strategic' with 'long term'. Some technologies are strategic in this sense, others are not.
[13] See www.3m.com/intl/in/html/3mhistory.htm

- Strategic value as platform for innovation. Finally a technology, even a quite basic technology, can be a platform from which to compete, grow and change incrementally. One of the most basic technologies of all is the wheel. Initially this was used for wagons and war chariots – later for motorcycles and SUVs. Spin a wheel and it becomes a gyroscope, which can be used for navigation. Spin it faster and it becomes a centrifuge. Put cogs on the outside and it become a gear and so on and so forth.

When a new technology is invented or enhanced, its potential may or may not be immediately obvious. Competitive pressures usually lead to a productive innovation being adopted quickly by companies. But this does not always happen. The failure of the British Admiralty to realise the significance of Parson's steam turbine (Scaife 1999) and the notorious delay of many who should have known better (including Thomas Watson Jr.) to realise the importance of computers are but two examples of where it took time for movers and shakers to realise the significance of a critical technology breakthrough. In summary, when the term strategic value is used to describe a technology, the underlying reality may be quite complex. Figure 1 sums up this framework, which we will now apply to information technology.

6. Strategic value and information technology

From one perspective, information technology is just another technology. However it is qualitatively different from most other technologies both in the range of things that you can do with it, its inherent complexity and the rate at which it changes. The analogy that Carr draws between IT with electricity is superficially attractive, but when pushed too far it breaks down. Furthermore, Carr fails to note some of the more positive aspects of this analogy. This point becomes clear as the strategic value of IT is examined using the above framework.

- Strategic value as fundamental to the organisation's business/industry. Many industries exist in the form they do today only because of IT. It is quite possible to envisage a world without computers or modern communications technology. There are many people alive today, including the authors, who can remember just such a world. But many industries today are totally dependent on IT to function at all or are moving in that direction. Examples include financial services, the music industry and the airline industry.

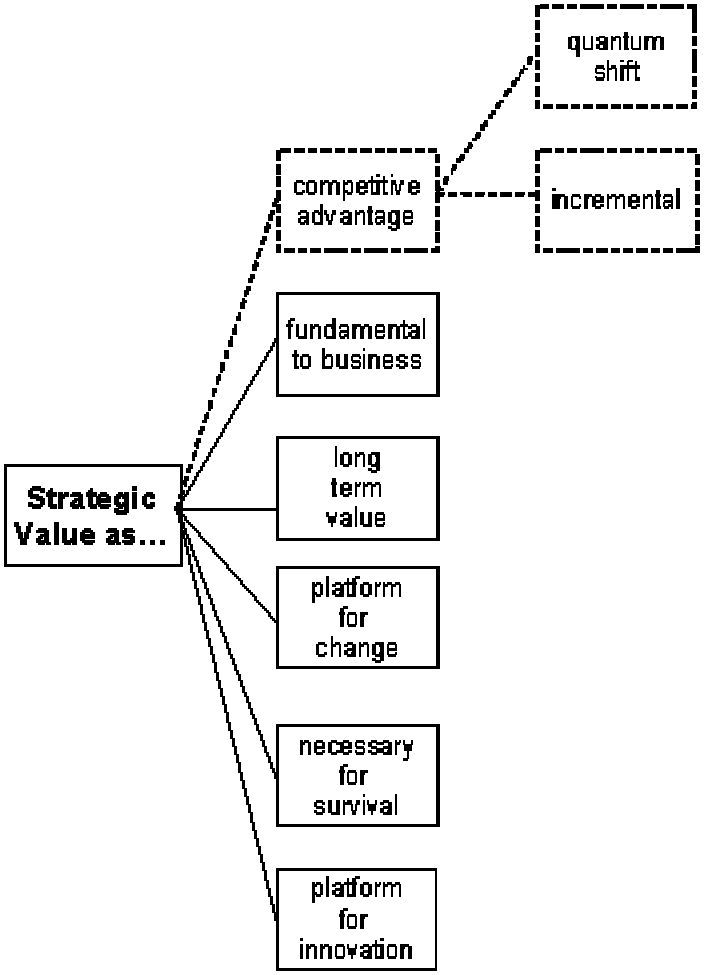

Figure 1: Dimensions of technology strategic value

- Strategic value as long-term value. One of the first people to propound this line of argument was Strassmann (1985). Ironically using the same analogies as Carr, Strassmann suggested that the impact of IT might, like the railways, be long term. Chandler (1990) and more particularly Schmitz (1995) for example, argue that the development of the railway and telegraph systems were important factors in the US economy's overhauling of England and Germany in the 19th century. There are weaknesses in this line of argument in general and these become more obvious at a company level. Investment in railways is long term. Once rails are laid, they can be used, with moderate maintenance, for decades, even centuries. IT on the other hand has short life cycles, but the embedded knowledge is, in many instances, cumulative. This has a long term impact, but one which may be difficult to measure;
- Strategic value as a driver of or platform for change of direction. Information technology can provide a basis for change of direction.

There are several examples of companies, which have used IT to change what they are. One of the earliest examples of this was the Lyons Tea company (Ferry 2004). Even IBM is, to some extent, an example of this.

- Strategic value as necessary for survival. There are many examples of where IT is necessary to even operate in an industry. No bank could hope to compete operate today with just paper systems. If it is not already so, it will not be long before airlines and hotels, which do not have Internet booking services, will not survive. If you want to provide services to the government, you will need to use electronic procurement and so on.
- Strategic value as platform for innovation. This is, as several commentators have noted, where Carr's article really misses the point. Consider the analogy with electricity. Electricity is, as Carr observes, almost a perfect, undifferentiated commodity. However what you can do with it is almost endless. It is perfectly true to say that companies don't need a manager for the electricity supply, but there is almost no manufactured or service product on the market that does not rely on *how* electricity is used. If Carr had written in, say, 1903, that electricity was not strategic and that it should be regarded the same way as water, there might be no DVD players, no televisions, no radio, no radar, no microwave ovens and no mobile phones to name but a few devices. It is the way that electricity is used (and to a lesser extend distributed and stored) that matters. The same is true of IT. As Curley (2004) says, the problem with IT is that people's ability to imagine what can be done with it lags the technology's capabilities.
- Strategic value as discontinuity/first mover. The decline of opportunities to gain breakthrough competitive advantage is the basis for Carr's 'follow, don't lead', recommendation. The evidence, as well as the argument, would appear to be on Carr's side in this case. It is even embedded in the industry's own hyperbole where, for example, companies such as SAP promote their products as embedding best business practices by industry. It this be true, then anybody with a chequebook and enough cash in the bank can have access to best business practices.
- Strategic value as incremental improvement. A leading proponent of this school of thought is Ciborra (2004, Brown 2003) who argued that long term, sustainable competitive advantage does not come from technology breakthroughs, but from a myriad of ways of doing things better and a process of continual improvement. Ciborra used paradoxes to illustrate his thinking. A good example is 'plan for small breakthroughs'. This is, if not the antithesis of Carr's follow, don't lead approach, at least an alternative that is not defeatist. Ciborra does not recommend that companies wait for the next information technology gizmo to launch a great leap forward, he suggests that successful companies are always on the lookout for little ways to use IT to make themselves that little bit better.

Figure 2 suggests how these strategic values of IT are changing. As Carr proposes, the strategic value of discontinuity has declined, as has the concept of long term value delivery. But other forms of strategic value continue or are increasing with time, the latter being incremental improvement and as a platform for change of direction.

The above analysis paints a rather different picture from that depicted by Carr. It suggests that Carr may be correct when he directs his attack against the traditional justification of IT as giving strategic value through competitive advantage delivered via radical differentiation and/or cost leadership. On the other hand, it also suggests that there are many other types of strategic value delivered by IT, which Carr either ignores or whose significance he does not appreciate.

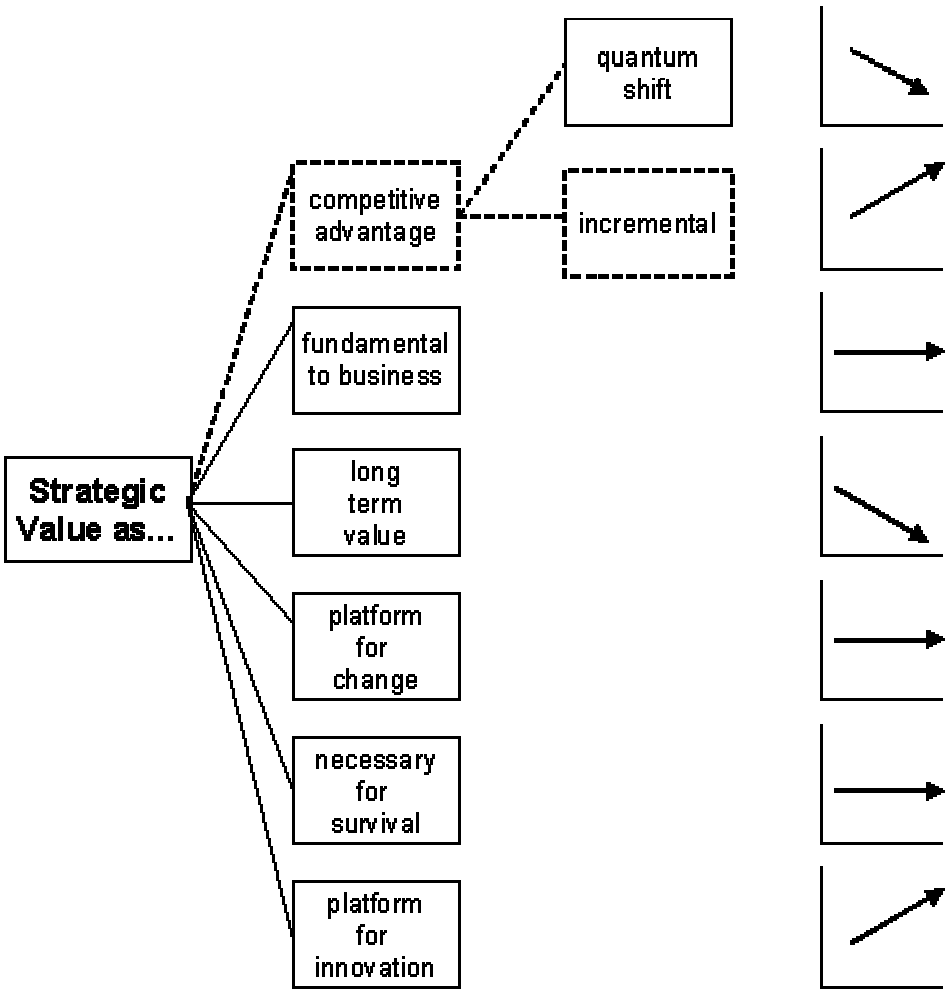

Figure 2: Change in strategic importance

7. Discussion and conclusions

The argument of this paper may be summed up as follows. Notwithstanding all the criticism hurled at him, there is some substance in part of Carr's argument, but there are many aspects of strategic value, which Carr overlooks. Clearly the past few years has seen a change in attitudes towards IT. Whereas a decade ago there was some sort of expectation that IT could be a *Wunderwaffe* i.e. 'wonder weapon' that could bring fame and fortune to the organisation, there is today a much more mature attitude and approach towards it. A poor understanding of how organisations such as American Airlines and American Hospital Supplies developed the 'killer applications', which propelled them ahead of their competitors, fostered the 'wonder weapon' approach. The IT community seemed to believe that simply playing the technology card was enough to ensure strategic advantage. Today it is realised that the primary driver of strategic value and thus strategic advantage is the application of innovative, creative and imaginative procedures, processes and practices that differentiate an organisation from its competitors. IT can play an important role in this but only in as far as it supports the organisation's innovation, creativity and imagination.

This new, more mature, attitude and approach to IT needs to be welcomed and, as far as Carr's article and book has contributed to developing such maturity, it is valuable. However due to the manner in which Carr presents his arguments there is a danger that some CEOs will misinterpret (or choose to interpret) Carr as being an advocate of computer minimalism and purely tactical use of this technology. This is an unfortunate way of reading what he says. Carr has a perfectly valid point when he says that for all the reasons cited in this article that it is becoming harder to be different. There will always be innovation, but to create a significant innovation and sustain it for long enough to earn an adequate return on it is becoming harder. However, when Carr implies that the day of the easy wins is over, it should not be interpreted as implying that wins are no longer possible at all. This is the great danger in his message.

One of the less splenetic and more measured responses to Carr came from Brown (2003) who argued that extracting value from IT requires innovation in practice, that the economic impact of IT is incremental, not big bang and that consequently the strategic effect of IT investment is cumulative. This paper has suggested that, while all of these things are true, the strategic value of IT can be regarded as being fundamental not just to companies, but to industries and that, as Ciborra and Curley point out, the problems may be in deficits of imagination by CIOs and CEOs rather than in inherent limits in the technology itself. The stance proposed by Carr, that companies sit back and wait, if pursued by everybody would bring advances to a halt. Without leaders and innovators, there will be stagnation. Without at least the prospect of some advantages or potential gain, organisations will not innovate. The assumption that it is always better to play follow-the-leader that permeates Carr's thinking, is based on a misunderstanding of the nature of technology change in general and information technology change in particular. A shrewd exploiter of IT could, by incremental means, make it well nigh impossible for a 'follower' to imitate successfully. The continual lag would eventually wear the follower down. This is the essence of Ciborra's argument. Organisations, which can use IT to adapt, innovate and change will always be ahead. The laggers will never close the gap.

Consequently, IT has the potential to deliver, and for those who can use it will continue to deliver, strategic value at all sorts of levels. The process by which it does so in the future may not be in the back office applications on which Carr concentrates his attention, nor on the big breakthrough myths that fuelled an earlier generation of competitive advantage hyperbole, rather it will be in the innumerable ways in which the technology is used, as was electrical power before it, to create new products, improve existing products and processes and thus change the way that the world works. There is more to strategic importance than the potential for discontinuities.

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