

# **Economic and Social Implications of Business-Process Automation Strategies**

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## **Abstract**

For several years there has been tension between contrasting visions of the future of enterprise computing: the so-called *integrated suite* versus *best-of-breed* strategies, championed respectively by Oracle and IBM. Commonly, this conflict has been seen as a matter purely of technical efficiency and relative cost; but it is much more. Whether one approach or the other is destined to prevail is an issue with large implications for industrial progress and even for the political complexion of society.

In 2004, the issue appeared to be resolved in favour of the status quo. But there are reasons to think that this may be only a temporary settlement. Since the conflict is likely to resume, it is desirable that those affected should understand its full implications.

## **Keywords**

business process automation, integrated suite, best of breed, ERP, business innovation

## **Introduction**

The year 2004 saw an apparent resolution of a competition between contrasting strategies for enterprise computing, which has deeper consequences for the general nature of business, and of society more broadly, than perhaps any other issue to have arisen in information technology in recent decades. Remarkably, while the implications of the alternatives for individual firms have received considerable attention, scarcely anyone has noticed these broader implications.

The competition is between so-called ‘best-of-breed’ and ‘integrated suite’ approaches to enterprise computing. On the one hand, a company may use different suppliers’ applications to execute different functions, linking them via middleware, while on the other hand it may prefer to use a single comprehensive suite of software supplied by a single vendor and containing modules for all functions needed. The (temporary) resolution of the conflict came with announcements by Chuck Phillips and Larry Ellison, respectively president and chief executive of Oracle and, in Ellison’s case, the most vocal advocate of ‘integrated suite’ philosophy, at Oracle’s AppsWorld user conference in San Diego in January 2004. Phillips and Ellison announced (Street 2004) that the new version of Oracle’s E-Business Suite (version 11i.10, released in November 2004) would contain features, notably the ‘customer data hub’, which help customers to link Oracle applications to homegrown or third-party applications – that is, which facilitate a best-of-breed approach.

Considering the vehemence with which Ellison has attacked the best-of-breed concept over the last few years (see e.g. numerous remarks quoted in Symonds 2003), this announcement cannot fail to be seen as one side conceding defeat to the other; it has been described as such widely in the business-computing press. But the choice between alternative approaches to enterprise computing is normally presented as merely an issue of technical efficiency and relative cost. In reality, it is a choice with far wider consequences, for the general nature of future business activity and possibly even for the political complexion of our societies.

There is a reason why these wider consequences have been overlooked. In a paper of fundamental importance, Warren Bennis and James O'Toole (2005) describe how the academic study of business has lost its way in the last fifteen years. It has become systematically distorted by what they summarize as 'physics envy', measuring itself 'almost solely by the rigor of [its] scientific research', and losing sight of the fact that many of the most significant aspects of business, like other human activities, are simply not open to the rigorous, mathematical techniques which are appropriate to the physical sciences. As Bennis and O'Toole see it, 'By allowing the scientific research model to drive out all others, business schools are institutionalizing their own irrelevance'.

In our own field of e-business, the syndrome described by Bennis and O'Toole is specially prevalent. Electronic business as an activity only began to get off the ground after the point when they describe business studies in general as taking the wrong track; so, quite naturally, academic study of e-business has to date manifested little awareness of the more humane traditions of intellectual discourse which Bennis and O'Toole see as a necessary balance to the one-sidedly numerical, scientific approach of current business studies – and consequently it has felt uncomfortable about addressing social or political implications of e-business technology. But in my view Bennis and O'Toole are correct in their critique. In its small way the following material offers one attempt to redress this balance.

### **The rise of enterprise computing**

Over the last twenty years we have seen one category of business processes after another automated via different genres of enterprise software application.

What first caught the public's eye, and led to the exaggerated enthusiasm followed by disappointment of the dotcom bubble at the turn of the century, was automation of the vendors' side of retail transactions, via Web selling. But 'e-tailing' attracted unusual public attention because it was directly visible to consumers; it was not the first e-business application, and it has become a commonplace to say that e-commerce is a less significant aspect of business computing than the use of IT to automate processes internal to companies.

The leading area here is the somewhat misleadingly named 'enterprise resource planning' (ERP) systems supplied by SAP, PeopleSoft (acquired by Oracle in December 2004, shortly after PeopleSoft had itself acquired its competitor J.D. Edwards), and others, which automate back-office functions such as production scheduling; in Europe, ERP accounted for more than half of all enterprise application spending in 2001 (Barling 2002). And there are other genres of enterprise application which automate other areas of business activity. Customer Relationship Management (CRM) systems such as those supplied by Siebel (also now –

September 2005 – acquired by Oracle) provide computerized support for the tasks of maintaining information accessible company-wide on the identities of customers and potential customers, their histories of interaction with the company, and so on. Supply chain planning systems (e.g. i2) optimize companies' supply chains. E-procurement systems such as those supplied by Ariba reduce the costs involved in purchasing.

There has been a proliferation, perhaps an excessive proliferation, of novel categories of enterprise application, not all of which have clearly established their value. Joseph Langhauser of General Motors was probably speaking for many other business leaders when he argued at the February 2003 San Diego conference on the future of computing that 'We don't need any more IT ... We need to figure out the business processes we have' (quoted in Kontzer 2003). Nevertheless, by now it seems indisputable that several core enterprise-application genres, including those listed above, have been yielding real benefits to many companies that have adopted them.

A recent trend, promoted particularly by Oracle through its E-Business Suite (the first version of which was released in May 2000), is to link the systems for automating business processes including ERP, CRM, human resources management, and others, into single, integrated suites of software which run all aspects of a firm's operations using data residing in a single central database. The alternative approach, which has come to be known as 'best-of-breed', is one in which a company acquires separate systems to execute different business functions, commonly from different suppliers, and links their respective inputs and outputs via 'middleware' which is normally tailored to a greater or lesser extent to fit the individual company's operations. One leading company associated with the best-of-breed approach is IBM, whose consultants are heavily involved in the process of building customized links between separate business applications, while not supplying such applications itself.

The term 'best of breed' implies that systems designed to execute individual business functions will carry those functions out better than the relevant components within an integrated suite. While that is clearly not a logical truism, many observers confirm that in practice it is a reliable generalization. According to Esteban Kolsky, research director with the Gartner business-analysis company, 'The broader you go with a suite, the less functional you become. You can always get a better solution with a specialized tool' (quoted by Morphy 2005). On the other hand the best-of-breed approach can create large management problems. Even David Mavashev, chief executive of a firm (Nastel) which supports middleware solutions, comments (Mavashev 2005):

best-of-breed solutions can rapidly become somewhat unmanageable. ... While each vendor component may be a best-of-breed choice, most closely matching the specific requirements of the relevant area of operations, the issue is that company performance will depend on end-to-end business operations encompassing potentially all of the individual vendor components. For example, a performance problem with one middleware component will affect the entire business process.

The integrated-suite approach provoked scepticism initially, partly because the original version of Oracle's E-Business Suite was released prematurely, in an incomplete and excessively bug-laden state. In 2000, Forrester Research predicted that general adoption of integrated business software just 'ain't gonna happen' (Osterfelt 2000). But many of the initial

shortcomings of Oracle's offering were overcome in later versions, and over the following years many managers seemed to be converted to the message that integrated-suite business software is the way of the future – both because of the large saving in implementation costs when an individual company does not need to pay for customized software links between separate best-of-breed systems, and because great efficiency gains and improved managerial control are possible if a company's operating data are held in one database accessible company-wide rather than dispersed among separate databases which may be inconsistent with respect to information and formats. Already in 2000 the academic commentator Thomas Davenport argued that 'The additional capabilities ... offered by a best-of-breed system are probably not worth the loss of integration' (Davenport 2000: 309). More recently, Oracle's leading competitor SAP has been extending its ERP system into a broader system more akin to a complete e-business suite. A number of previously-successful players in specialized enterprise-application niches (e.g. i2 in supply chain management) seem to have been struggling in the face of competition from the comprehensive systems.

The initial appeal of the integrated-suite approach was predominantly to smaller customers:

In general, small and medium-sized businesses have shown the greatest propensity for going with unified product stacks, valuing the simplicity of the stack over any fears of lock-in [to a single supplier who might exploit that situation in terms of pricing, etc.], while larger enterprises have generally valued functionality over simplicity and have gone with a 'best-of-breed' approach (Berquist 2005, p. 8)

But, before Oracle's January 2004 announcement, my impression of the consensus among informed onlookers was that integrated-suite was ultimately destined to prevail everywhere.

### **Freezing business evolution**

Most commentators discuss these developments purely in terms of reducing the costs of business operations and increasing their efficiency. In the opening years of the new century, when many companies were finding themselves focusing on survival more than on the long-term future, that was inevitable. But their significance goes far further. Automating business processes, and particularly the seamless upstream-to-downstream automation represented by the integrated-suite approach, implies suspending the ordinary incremental evolution of processes that occurs in the absence of automation.

That becomes very clear from the literature introducing managers to the ERP concept, which repeatedly stresses that a company must put effort into optimizing its business processes before automating them. Kalakota and Robinson's standard e-business textbook, for instance, says (2001, p. 262):

Successful companies strive to understand their business processes, simplify them, and introduce automation. Unsuccessful companies start their ERP implementation effort with automation ... Automating complex or non-value-added processes, however, will not increase productivity ... Automation without simplification only immortalizes ineffective processes.

What business processes are most effective is a question whose answer constantly changes as the business environment changes, and if automating processes ‘immortalizes’ them, in Kalakota and Robinson’s word, then it is obvious that a company will do well to bring its processes as up-to-date as it can before taking that step. But the business environment will not cease to change just because a company has automated its processes. The corollary of Kalakota and Robinson’s recommendation is that adopting ERP will make it difficult for a company to continue adapting to future changes. Thomas Davenport (1998) commented that ERP systems ‘impose their own logic on a company’s strategy, culture, and organization, often forcing companies to change the way they do business’; two years later he wrote (Davenport 2000: 21):

No longer are companies likely to dream of visionary process designs and then make them a reality. One company’s processes are likely to be similar to another’s. The process designs that best fit a company’s strategy and business environment will fall prey to those that best fit a system created by a far-off software vendor.

Joseph Schumpeter’s classic account of the functioning of a free-market economy famously described it as a ‘process of creative destruction’ (1943, p. 81). Markets engender a continuing process of discovering how to create more value from available resources, as new experiments prove profitable and spread, causing older ways of doing things to be discarded. But the tendency of business-process automation must be to moderate this gale of valuable innovation.

This is specially clear in the philosophy promulgated by Oracle. Symonds (2003, p. 52) quotes Larry Ellison as

want[ing] customers to change their processes to take maximum advantage of the Internet-based best practice captured by the software. Ellison said, ‘Don’t tell us how you’ve been running your business ... It’s a classic business mistake to say, “This is how we do business; change your software so we can automate it.” ...’

Ellison’s vision has been one in which companies give up their individual, distinctive business processes in favour of the economy and robustness associated with a standard, uncustomized software system that covers all aspects of business operation. Comparing the integrated-suite approach with the best-of-breed approach, Ellison commented (*op. cit.*, p. 44):

The applications software industry sold components, not complete business systems. The customer bought the components and assembled them into systems as best they could ... You don’t buy a 747 and decide to speed it up by sweeping the wings back a little more. That would be expensive and dangerous ... Why do people use heavily customized, one-of-a-kind business systems? Because they had no other choice.

It may be true that customers for enterprise-application software had no alternative to individually-tailored systems before Oracle’s E-Business Suite, but logically it does not follow that they can have no reason to continue with the individually-tailored approach once the other choice is available. Another possible reason, which might or might not be valid in a particular case, would be that a company’s competitive advantage depends on some of the

distinctive business processes that have to be given up as the price for adopting standard software. The more business-process automation eliminates individual companies' distinctive competitive advantages, the less possible it becomes for market forces to bring about valuable innovations.

### **The evidence of business process patents**

This is not to say that suspending the evolution of business processes would eliminate all valuable innovation. Plainly, it would not. The same internal business processes can be used to produce different outputs in terms of products or services. Product innovation could continue even if processes did not alter at all.

But the socially-beneficial effects of a free market economy have not traditionally related only (or, perhaps, mainly) to product innovation. A commercial enterprise produces its outputs by applying some pattern of processes to some range of inputs of scarce resources (human labour, data, raw materials and components, and other things); industrial advances are often associated with finding methods to produce equivalent outputs from fewer or cheaper inputs, leaving more resources free to benefit members of society in other ways.

If one doubts that distinctive business processes are often a crucial aspect of companies' competitive advantage, one proof is the recent explosion in business-process patents. Until recently, a process in itself could not be patented, but in the USA that legal principle was overturned in the State Street Bank appeal decision of July 1998 (see e.g. Lessig 2002, pp. 208–9). By November 2002, the patent-monitoring company Derwent Information claimed to have catalogued 200,000 business-method patents internationally (Banks 2002). James Gleick (2000) has written satirically about the novel environment of proprietary thoughts and ideas which is coming into being. *The Economist's* Frances Cairncross argues (2002, p. 45) that this situation itself poses a serious threat to competition, which may well be so. The point most relevant here, though, is that the effort companies are putting into securing and enforcing patents on their business methods is a clear demonstration (if proof is needed) that successful methods are a crucial component of commercial competitive advantage.

Thus, even if the law were changed tomorrow to strike down all business-process patents, the standardization and freezing of business processes associated with enterprise-application software must itself tend to damp down the beneficial effects of competition.

### **A shift to punctuated equilibria?**

Business-process automation tends to reduce competition in another way also. Companies are beginning to extend the reach of their enterprise-application networks beyond their own boundaries to include favoured suppliers within 'extranets'. In consequence, Frances Cairncross (2002, p. 15) comments, 'Companies build deeper links with fewer suppliers'. Even if processes within a single company are slow to change, rearranging supply relationships among a wide range of companies with different modes of operation is another way that the overall pattern of productive activity in a society can adapt rapidly to permit more value to be squeezed out of fewer resources in a changing world. The more that

companies move towards fixed relationships with narrow ranges of suppliers, the less room this mechanism has to yield beneficial innovation.

So, for society as a whole, the spread of business-process automation poses real long-term risks. Yet, for individual companies, the medium-term gains in terms of operating-cost reduction and operating efficiency may often be too attractive to turn down. And the style of business-process automation that claims to offer the largest medium-term gains (uncustomized, comprehensive suites) is just the style which poses the greatest threat to the 'creatively destructive' action of the free market.

Even if integrated e-business suites were to become a standard component of the industrial landscape, would that mean the end of innovation in the activities which they perform? That seems unlikely. If there are large enough gains to be made by changing some aspect of a company's methods, the point will surely come eventually when it is worth abandoning one's software system if it stands in the way of change. But we can expect the cost of change to be much higher than it used to be. Before IT, a manager who saw a better way to organize things had only natural human inertia and misunderstanding to overcome. Those hurdles are not trivial, but in future they would still exist and there would be added the large extra barriers of replacing a fully-automatic with a partially-manual system, or paying the considerable costs of programming custom-designed software components.

The effect might be that an industrial ecology of continuous incremental evolution would be replaced by one of 'punctuated equilibria', to borrow a metaphor from evolutionary biology. Business processes would remain fossilized in the form of standard enterprise-application software for long periods, until the potential gains from innovation build up to the point where the pressure is irresistible and the current software is abandoned in favour of a burst of innovations.

## **Political fallout**

In democratic societies, changes of this order to the complexion of the industrial landscape might have political consequences.

A free market produces winners and losers, and winning or losing is not correlated with players' moral worth or likeability. Voters' natural sympathy for those who lose through no fault of their own make a statist form of society look attractive to many: people would like governments to intervene in the economy sufficiently to make everyone a modest winner. Where free markets exist, they do so because enough voters are persuaded by the argument that the economic intervention needed to achieve that ideal would destroy the socially-beneficial operation of the market: even the poor gain from a free-market economy, because a rising tide lifts all boats.

If voters perceived that industrial innovation was being stifled, and economic competition between companies was ceasing to be an engine of innovation and turning into a mere jostling for commercial advantage within a zero-sum game, this argument would lose its force. Consequently, widespread adoption of standardized business-process software could push the politics of industrially-advanced societies in a Leftward direction.

Thus, medium-term cost-effectiveness for companies is really a minor aspect of the overall potential consequences of a decisive choice for one side or the other in the integrated-suite versus best-of-breed competition. It may be that integrated-suite versus best-of-breed should be seen as setting the interests of individual firms, and of society as a whole, against one another, in the sense that the integrated-suite strategy offers firms financial benefits that they cannot individually afford to turn down, while widespread adoption of that strategy tends to negate the advantages which society reaps from containing arrays of competing firms.

In the long term, admittedly, it should be in an individual firm's interest, as well as society's interest, for it to preserve its propensity to innovate. But even if a company can afford in principle to give long-term considerations priority over medium-term survival or profitability, in practice it may lack the mechanisms to do so. Speaking from the chair when this paper was presented orally, Benoit Montreuil of Université Laval commented that in his experience this sort of software-strategy decision is made by technical staff who have little awareness of wider potential implications such as those discussed here. Companies are not in practice treating those implications as a drawback of deploying ERP. Holsapple and Sena (2005) quote a study of 162 adopters of SAP software which showed that 'standardiz[ation of] business processes' was actually the leading motive for adopting ERP, ahead of many uncontroversially desirable goals such as optimizing supply chain or inventory, or increasing productivity.

### **A temporary truce**

Since Oracle seems now to have resolved the conflict in favour of the status quo – that is, in favour of the multi-vendor business applications environment which had evolved in an unplanned way, before Oracle began to push for its alternative vision – there might seem to be little practical reason to spend time thinking about the hypothetical consequences of realizing that vision.

But the 2004 'truce' does not necessarily represent a permanent settlement. Oracle's E-Business Suite 11i.10 is the way it is because current trading conditions forced Oracle to move that way – not because Oracle have changed their mind about the vision. Ellison and his colleagues were explicit about this in January 2004. Ellison 'conceded that a different approach was necessary for companies battling too many legacy systems and third-party applications', however at the same time he said 'We are not giving up on what we said before, but not everyone in the world wanted to go that way. ... People said they wanted to live in a heterogeneous world' (quoted in Street 2004). According to Oracle spokeswoman Karen Tillman (quoted in Wagner 2004), 'The [customer data hub] provides another option for customers, we still think, that the overall E-Business Suite on the single platform is your best strategy, the best information below its cost'. After the PeopleSoft acquisition at the end of 2004, Oracle announced a plan called Project Fusion; one interpretation of the Project Fusion publicity is that Oracle aims by 2008 to meld its own existing systems together with the PeopleSoft and J.D. Edwards systems and, now, Siebel's CRM software in order to create an even more comprehensive integrated suite.

If trading conditions are now easing so that companies begin to lead a less hand-to-mouth existence than many of them have been doing since the year-2000 crash, they may become

more willing to entertain the possibility of comprehensive renewal of their IT systems. In a debate on the alternative strategies published by *Accountancy Age* in February 2005, Jon Hughes of Microsoft Business Solutions' partner group urged (Hughes & Hayler 2005) that 'While best-of-breed applications might solve individual pain points, an integrated suite provides the convenience and the longevity to achieve ongoing returns ... The integrated suite approach comes into its own in its ability to cut "fat" from your business.' (Arguing the opposite point of view, Andy Hayler claimed that enthusiasm for integrated suites often represents an overreaction against the excesses of the dotcom bubble in favour of the possibly illusory security of offerings from the largest and longest-established software vendors.)

As the hosted-software model of enterprise computing, in which firms outsource their computing needs to 'application service providers' (ASPs) such as Salesforce.com, begins to spread as an alternative to the older model whereby enterprise applications were owned and run in-house, Erika Morphy (2005) notes that the same integrated-suite v. best-of-breed issue is starting to crop up within the new hosted model. Morphy says that as yet 'there are few comprehensive hosted suites on the market', so that companies opting for the hosted model have been forced to stick to the best-of-breed strategy. But as such suites begin to appear (Morphy cites several systems, e.g. NetSuite, which contain broad enough functionality to approach the 'integrated suite' category), she gives reasons for questioning whether the best-of-breed approach will survive in the hosted model. Morphy quotes Esteban Kolsky as claiming that hosted best-of-breed applications typically lack scale: 'I have yet to see any actual implementations that scale to any large degree.'

Furthermore, new pressures are beginning to impact on business which may well increase the attractiveness of the integrated-suite approach in future, irrespective of whether Ellison and Oracle in particular continue to advocate that philosophy. Many recent changes in the regulatory environment are beginning to impose requirements for audit of internal business processes at unprecedented levels of detail: one example is the 2002 US Sarbanes-Oxley Act, whose real-time disclosure rules came into force in August 2004 and which affects many businesses not based in the USA; another is the Companies (Audit, Investigating and Community Enterprise) Bill which is going through the UK Parliament at the time of writing. According to Mike Davis of the Butler Group (Butler Group 2004), it is clear that if the Companies Bill becomes law in Britain many firms will be forced to invest in new IT systems in order to be able to comply. On the face of it it seems likely that integrated business software systems centred on single company-wide databases would make compliance with audit requirements easier, whether or not they are desirable in terms of long-run business profitability. And the drafters of the new laws are unlikely to have had much regard to the possibility that favouring the integrated-suite approach could have implications for business innovation, or for the electorate's voting propensities.

Thus, the integrated-suite versus best-of-breed debate is unlikely to have gone away for good.

## Conclusion

My purpose in writing this paper is not to take sides in an ongoing debate about the future shape of enterprise computing. That is not a role for an academic. But we should be aware of the full implications of the debate. They extend far beyond medium-term cost saving. It is entirely appropriate for academics to draw attention to the fact that obvious financial

considerations are potentially offset by less-obvious socioeconomic and political considerations.

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