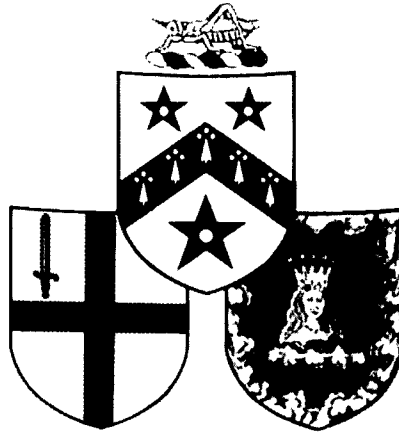


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CAN THE CITY ADAPT?

Lecture 1

THE IMPACT OF NEW TECHNOLOGY ON THE MARKETS

by

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THE IMPACT OF NEW TECHNOLOGY ON THE MARKETS

Professor Daniel Hodson

It is a great honour to be appointed to the Mercers School Memorial Chair of Commerce, particularly as someone whose career, whilst I hope commercial, has been only marginally academic. Nonetheless fortune has provided environmental circumstances in which, in looking at the future, business and life experience generally may, I say may, be at least as useful as academic. And why? Because we undoubtedly stand, as a human race, at the beginning of the greatest epoch of change since the Industrial Revolution. I speak of course of the technology revolution which is beginning to transform the lives of all who live on this planet.

At this point I must pay due tribute to the Mercers School, in whose memory this chair was instituted. It's interesting to note that it was founded three centuries before that first industrial revolution and provided high quality secondary education till close to the one we are currently experiencing. Now it lives on under the aegis of Gresham College, to well beyond the time when the initial force of the great period of change ahead is spent.

It would be nice to think that Sir Thomas Gresham, the Founder of this College, a man of great vision and a Mercer, would have embraced the new technology. If history had been different and the Mercers Company and its members had retained their stranglehold on international trade in and out of London e-commerce might have become e-mercery.

As with all revolutions, the outcome is unpredictable and no more so than in this case. We certainly cannot with accuracy make forecasts for any human functions even five years ahead, and here is my good fortune, for there is a strong need to return to basics, a comforting feeling for a neophyte academic.

I learned one adage at my mother's knee – 'There is nothing new under the sun'. I will therefore be making a recurring point: in the technology revolution, as in every other aspect of human life, you must learn from the past before you begin to understand the future.

I was at the eye of the storm in a period of tumultuous change in global derivative markets, one which nearly destroyed a key City institution and which altered the lives of many thousands of people associated with it. The story of the London International Financial Futures and Options Exchange or LIFFE over the last few years is as important as it is dramatic, for it demonstrates graphically how technology can bring change violently, suddenly, and without mercy. Fortunately the Exchange has been able to pick itself up and move forward with confidence to a new technological era.

I intend in this lecture to draw conclusions from the salutary recent experiences of LIFFE and apply them in the form of six propositions to the potential impact of technical change on other City markets and institutions. However each could apply with equal force to any human activity affected by the new technology.

- 1 Technology is at its most powerful when supporting radical process change.
- 2 Technology is never a substitute for what has gone before, but brings advantages of its own, which in the end greatly outweigh that which is left behind.

- 3 Old technologies can sometimes hang on against new technology for a surprisingly long time, but then tend to be overturned very quickly indeed.
- 4 Technical revolution often brings unexpected and unpredictable lateral consequences of great significance.
- 5 Technology, in replacing many complex and high volume processes, will over time drive them inexorably and remorselessly towards quick and cheap commoditisation.
- 6 In matters relating to technology, the timing of key strategic decisions is vital – neither too early nor too late – but one can change to the other with great suddenness.

In July 1997 the Board of LIFFE went away for two days to a country house hotel called Hanbury Manor to determine the Exchange's technology strategy. A long internal review of the options had been concluded and all present had been properly briefed. In the final and decisive vote of the meeting the elected members of the LIFFE Board were split exactly 10-10 on the issue of whether to throw the bulk of the Exchange's resources behind electronic trading; or to support the open outcry, physical floor method which had served the Exchange so well. It was only the votes of the three non-elected members, those of the two outside non-executive directors and mine, as Chief Executive, which won the day in favour of electronic trading, 13-10. This was a Pyrrhic victory indeed for it carried no consensus within the Board and certainly not in the membership as a whole – and it proved to be extremely difficult to communicate externally.

As an aside I take no pleasure in my share of the responsibility for this weak decision, or for failing to persuade more of my colleagues of the need for positive action.

On June 9th 1998 the full membership of LIFFE, as recommended by the same Board, voted almost unanimously – 98% – to embrace electronic trading as soon as possible and radically to change the governance of the Exchange, moving it away from mutuality to the admission of outside shareholders and the adoption of a for profit motive.

What catalytic events created such a dramatic turn-around over the course of 11 months? I will attempt to reconstruct them in the context of my six propositions and lessons for the markets of the future.

Proposition one is that technology is at its most powerful when supporting radical process change.

LIFFE was founded in 1982, to provide a London-based financial futures and options exchange and setting out to take the best ideas for its operations from comparable institutions across the globe. In principal this meant adopting the methods of the two great and old-established exchanges in Chicago, the Chicago Board of Trade, and the Chicago Mercantile Exchange.

Over the years these exchanges had refined the mechanics of so-called open outcry trading – traders buying and selling standing face to face in a ring or pit – to a fine and beautiful art. But such a system was highly labour intensive – the pit traders were only the front line troops and they were backed by a whole team of runners and clerks taking orders and recording and communicating their execution – as well as by a telephonic distribution chain stretching back through member/brokers offices to the client himself. It did however have several key and desirable characteristics which made it very difficult to replicate in any automated or electronic environment:

Liquidity: large numbers of traders in a pit, even if they were not trading, were symptomatic of enormous buying and selling power and many traded only for their own account – so-called locals – and so were constantly supporting and deepening the market by being ready to step in if they saw the slightest opportunity.

Transparency: one could literally see and feel the market there in the pit, look into the eyes of and read the minds of the participants, know who was buying and selling. Regulation was made easier since all activities in the pit were totally visible to all, at least in theory

Price discovery: the presence of a group of traders looking for opportunities meant that the price in the pit was always at the market, for it was the market. It was impossible to trade away from the market price, since any deviation would be quickly spotted and instantly ironed out

For all these reasons, LIFFE was drawn into adopting open outcry as its chosen method of trading. Whilst technology intuitively seemed to be able to solve some of the inefficiencies of open outcry, those electronic trading systems that existed were rudimentary as well as clumsy and expensive in distribution.

Open outcry served the Exchange very well and in 1988, in a farsighted move of huge importance, it added a German Government Bond to its range of futures contracts, or products. It became known as the Bund and was quickly a great success.

At that time there was no comparable German exchange, but by 1991, the Deutsche Terminenbörse – or DTB, now called Eurex – had been launched, and had taken a different view of the future platform for trading. It believed electronic trading would drastically reduce the human handling costs of open outcry and turn the distribution of transactions on its head. The basic electronic model is of a system which brings together buyers and sellers trading at remote terminals in their offices or at home – theoretically anywhere in the world – and automatically matches their orders through a central processor.

It is hard to imagine a more graphic example of a radical process change than moving the actual trader away from face to face confrontation on the physically confined floor of an exchange to sitting behind a screen in an office half a world away from the computer which represents the exchange on which he is trading. Yet this is the basic comparison between the two types of trading platform.

It's possible to argue that over time technology could have eliminated most of the superfluous costs of open outcry and orders could have flowed via state-of-the-art communications technology directly and without human intervention from client to floor trader. LIFFE was in 1998 quite far advanced in developing such a system.

However and despite the reasonable dreams of a virtual reality floor in the distant future, open outcry was for the foreseeable future stuck with the floor and physical traders on it. The capacity, efficiency and speed of global screen based distribution was in the end too much for pit based trading.

As history records, the DTB went ahead and launched a competitive Bund contract on an electronic trading platform. It quickly established a beachhead of around 30% market share, where it stayed for a number of years whilst its screens were confined to Germany. However from 1997 DTB trading terminals started to become available in London, New York, and Chicago, accompanied and assisted by a massive marketing effort which provided them free together with an additional subsidy, as well as significant fee reductions. LIFFE's members and their US affiliates could hardly resist the temptation to use them, whatever their emotional attachments might have been. Up to that point the limited distribution had acted as a cap on DTB's market share but as a result of these initiatives more and more of the

DTB's business started to be done outside Germany and its market share moved inexorably up. In the end it was the sheer power of global distribution to a trading terminal anywhere that ensured its ascendancy and final triumph in all but eliminating LIFFE's market share by mid 1998.

It is a comparable radical process change that will transform – is transforming – financial markets. The tools are already there. Those who study the development of the communications industry are clear that bandwidth – the size and capacity of the electronic pipes down which electronic information flows round the world – is going to all practical intents and purposes to be infinite, and very cheap. Thus messages of great complexity and in gigantic volume, including high quality video, will be moved across global communications networks instantly. The internet is taking encyclopaedic information and shopping and buying opportunities into offices and homes. Interactive personal screens, currently in fixed locations for the most part, will be combined with TVs and telephones – voice and video – and will be totally mobile.

In short it means that you will be able to do most things you would normally do from an office from any location you choose. It will shortly be possible not only to speak to but to see any colleague via a piece of hardware retrieved from one's jacket pocket, wherever one might be, at home, in the office or abroad. It will also be possible to transact a wide range of personal and corporate business and to access news comment and information of every conceivable variety, in audio, video or written form, on exactly the same kit. Or just watch the movie, listen to the music or read the book of your choice. No sight yet of a virtual G&T or Havana, unfortunately.

This raises a number of key questions for markets of the future. No doubt transactions on formal markets will be screen based – I will address OTC markets in a later lecture – but where will their participants, users, traders and brokers actually be? Where indeed will they want to be? Will the ability of human beings to transact business, access information and communicate out of their back pockets mean the disintegration of the office and corporate trading rooms as we know them? Will the business environment become increasingly remote – at home for instance if you happen to be there – simply a series of virtual one on one conversations and virtual meetings, interspersed with appropriate virtual transactions and information access? Will this ever replace the buzz and feel of direct human contact or will we simply get used to it? How will these remote people be organised, managed, incentivized and regulated? How will they be educated and psychologically and emotionally prepared for these changes? I shall be looking at all these issues in later lectures.

The technology is unstoppable and the radical reprocessing it brings is, quite simply, the empowerment of individuals to participate in markets anywhere, anytime. They may even demand the right to do so, as a condition of employment. The challenge for their employers is colossal – and immediate.

The second proposition is that new technology is never a perfect substitute for mature and sophisticated old line processes, but brings advantages of its own, which in the end greatly outweigh that which it leaves behind, however attractive the latter may seem in isolation.

Applying this LIFFE, it's difficult to blame the Board for its apparent lack of foresight at Hanbury Manor. The Exchange had been successfully staving off the increasingly intense competition from the DTB for many years, and if there was a consensus, even at that time, it was that the liquidity in open outcry and particularly from the 'local' – own account – traders would permanently preserve it. History had proved, it was felt, that open outcry would always win. Thus an earlier alliance with the CBOT, proposed as a key insurance policy to keep the Bund in London, was rejected, largely on the grounds that automated trading could never emulate the essential virtues of open outcry – liquidity, transparency, price discovery. It was

argued that it was totally inappropriate to consider sharing some of the valuable Bund franchise, for a purely imagined threat.

But in the end the Bund did slip away from LIFFE. What was it that finally weighed in the balance and tilted the scales away from open outcry and towards electronic trading? First and foremost the great and vaunted liquidity advantage proved to be illusory, as international distribution built DTB market share. With the help of arbitrageurs, DTB literally leached LIFFE's liquidity away from it and confidence in its ability to absorb trades at least as large as those on LIFFE grew. Finally increasing numbers of LIFFE locals found that they could make a very satisfactory living out of electronic trading. To be sure they had to trade in a different way, and take larger positions and for longer periods, but they were nothing if not adaptable particularly with their living at stake. And so it was that liquidity, that prized asset of open outcry, moved across to DTB and, in a highly symbolic sense, to electronic trading as a whole.

What had happened was that as liquidity ceased to be an issue the other obvious advantages of electronic trading – ease, accuracy, speed and cheapness – simply overwhelmed open outcry's supposed remaining assets. Neither transparency of the particular type seen in a pit environment, nor its unique price discovery mechanism – both of which are available but in a different form with electronic trading – were valued enough to save it. And the markets have steamed onwards without them.

One important parallel as one looks more broadly across today's markets is the role of the securities broker as an intermediary, in both wholesale and retail environments. Brokers to market users have traditionally performed interlinked roles, that of adviser and that of executor and settlement agent, to which, in the case of futures market should be added the task of trade confirmation or clearing – standing as guarantor of the client's future commitment. Full service brokerage contains a high element of personal content and one to one contact, based on detailed multidimensional analysis and advice, leading to the placement of an order to be executed by the broker. In the case of large orders or those in illiquid securities, this might involve a high element of guile and skill in execution to obtain the best bargain for the client. Knowledge of markets and where to find or place securities is key, as is of course in the case of larger brokers the ability to take business on one's own books to fulfil, or 'fill' the client's need. The client is happy to pay for the level of service received, because the broker is seen to earn it; and the personal approach is valued. Technology will change all this for, although it can never substitute for the prized personal relationship, it can bring other advantages of speed, ease, instant and detailed advice and direct access. And, despite everything, the personal role will inevitably wither.

Consider how electronic trading has brought execution to the very desk of the user – shortly even to his hip pocket – so that he has in effect direct access to the market, which in most cases is probably liquid enough for him to trade satisfactorily himself. Where there are several market pools in which to trade the same security, as there are increasingly with equities, technology will be able to go out and find the best prices from any suitable market anywhere in the world probably without any human intervention. So the client can finesse the broker's role by executing for himself.

In addition the advisory role will change radically. In the electronic age information is everywhere and advice will no doubt pour down on the client from increasingly sophisticated sources such as instant or 'streamed' video through the internet or video – 'v' – mail and other forms of multimedia including video telephony. Some will be paid for, from boutique and other sources. Technology will enable the client to put together his own menu of pertinent information, and receive it in any form he wishes. What is certain is that the cosy telephonic broker client relationship, bolstered by the occasional bout of hospitality will for the most part cease to exist, however valued and successful it was in the past.

As it happens I'm not a total prophet of doom for the brokerage community. I certainly do not subscribe to the school which envisages that online trading availability to clients will result in wholesale disintermediation – that mouthful from across the Atlantic that means cutting out the middleman. I do not doubt that there will be attempts at creating bucket shop exchanges out there in the ether, open to all comers, but I doubt whether they will gain mainstream acceptance, and certainly not from regulators, who will do all they can to limit their activities. In short, intermediaries will, I am sure, continue to have a valued, vital and necessary risk management and regulatory role, as I shall argue in later lectures. Access to the settlement system, whilst increasingly instantaneous and mechanised, will also be part of their function. I am however sure that most execution will be direct via screen in the hands or on the desk of the client, albeit risk monitored to control exposure, but some – large, secret and/or in illiquid circumstances – will be personalised through a broker, and executed by the broker himself.

Perhaps the greatest challenge and opportunity facing the broker will be to use all the many and powerful communication, information and analysis tools which are rapidly becoming available to obtain competitive advantage and to hold his clients. In other words to play them to enhance and strengthen his client service rather than let events swamp him. If he does not, broking will simply become a highly commoditised and cheaply priced automated service, and his client will obtain advisory and other ancillary services from other specialised, or even free sources. He will have fallen into the ever present trap of allowing his service to be split up and disaggregated. I shall describe how this might be avoided in my next lecture.

The third proposition states that old technologies can sometimes hang on against new technology for a surprisingly long time, but tend then to be overturned very quickly indeed. The strange and instantaneous death of the old Stock Exchange floor is a famous example of the latter

The LIFFE market, and indeed its Board, was clearly lulled into believing that open outcry would always hold its own against electronic trading, and small but significant changes in market share in 1997, in the run up to the Hanbury awayday were, at first, hardly noticed. As a result important strategic decisions were missed, and none more vital than the need for a resounding endorsement of the future importance of electronic trading at Hanbury Manor, rather than the half-baked decision actually handed down. Nonetheless, the Board had made a decision the previous year to put equity option contracts on to an electronic platform trading, subsequently known as LIFFEConnect and many of us had felt for a while that a steady migration to electronic trading was an inevitable feature of the future of the Exchange. The question was when the change would start, and the universal conclusion at the time of Hanbury was 'not yet'.

Even then, virtually everybody in the market, including the entire Board and even our competitors, was astounded and shocked at the speed with which the Bund contract migrated to the DTB. This was instant revolution at its sharpest, and led directly to the Board's radical change of heart, although in the meantime there were a series of bumpy Board meetings and awaydays – one colleague likened these fraught sessions to 'cats fighting in a bag'. Indeed the Board moved at least once perilously close to rejecting electronic trading outright and to declaring that the Exchange should stand firmly behind open outcry, 'do or die'. But by the time this process had started it was of course far too late.

This is a case study to be examined closely by retail stockbrokers. Whilst securities broking as a whole is being affected by the increased use of trading screens at the client end, the process is a steadier and more transparent one in the wholesale section of the market, where the ever-increasing use of remote terminals is an accepted feature. At the retail end the picture is different, particularly outside the US. Many retail stockbrokers are having great difficulty in accepting that their personalised services may be largely – but not necessarily completely – replaced by direct on-line market access, and multimedia news, advice and

comment, either from themselves or, less desirably, others. They are potentially gulled by lack of internet penetration, or basic computer literacy, in their client base, and their current ability to carry on as before, regardless of what is happening elsewhere.

But there are a mass of market factors at work here, each in their own way undermining the status quo, and pointing to a potential sudden and devastating change in the retail equity market place. Many professionals are achieving greater wealth earlier in their careers, calling for substantial investments to be made and managed; in any event such people will have a natural affinity with technology. At the other end of the scale, not only is retirement occurring earlier, but many retirees are taking the opportunity to familiarise themselves with computers, the Internet and its possibilities, and will be attracted by online possibilities. And between these two, internet access penetration and familiarity with and use of e-commerce opportunities is likely to grow at an astounding rate, just as did the use of mobile telephones and satellite television.

This argues not only for high demand for direct online trading from existing clients, but also new classes and types of retail investor who will not want to trade in any other way. The revolution will come as swiftly and quickly as did the use of cash machines to disburse cash rather than standing in an endless queue waiting to be served by a teller. Retail brokers, if they are to keep their business and build on it, will need to provide a range of online services, including direct trading; they will also need to stand ready to convert their entire operation to such a format, for using hybrid – ie old line and automated – systems is not a viable or profitable, option when the old is rapidly giving way to the new. The changeover will be virtually complete within 5 years, and probably in less than half that time.

The fourth proposition is that technical revolution, when it comes, often brings unexpected and unpredictable lateral consequences of great significance.

In the case of LIFFE it was the downfall of the longstanding and trusted co-operative method of exchange ownership and governance. In a word, it became clear during the time between the two votes, for reasons which I shall analyse in a later lecture, that it was totally inadequate to provide an efficient strategic planning and decision mechanism to meet the challenges of radical change. In particular LIFFE had been wracked and paralysed by continuous board level warfare between the advocates of open outcry and electronic trading flotation and lacked the focus of a strong profit motive. Consequently it was out manoeuvred strategically by a nimbler, more perspicacious and ruthlessly dedicated rival.

Now, all over the world, exchanges have taken note of the LIFFE saga and are coming to realise that limited company status with bottom line orientation, and usually with some non-market shareholders, is the only way forward in a world which will increasingly challenge their right to survive. In particular, the members of the LIFFE co-operative graphically proved when the chips were down, and real profitability involved, that they had no loyalty whatsoever to the exchange which they owned and governed.

In my view there will soon be a minority of co-operative as opposed to what one might call PLC exchanges. I will be explaining on another occasion how this will inevitably contribute to their sidelining in importance in the financial centre where they are located, and how many if not most of them will soon become subsidiaries of global technology/communications or financial service enterprises, if they exist at all.

Such an unexpected effect on the ownership and distribution of equities may well be already stemming from the online direct trading revolution in retail stockbroking. The latter will put the retail investor much closer in ease of market access and knowledge terms to the wholesale trader and fund manager and is already leading in the US for instance in a surge in retail daytrading – buying and selling a particular share on the same day – as well as share ownership. Direct retail ownership indeed is beginning to dwarf that of wholesale investors in

certain sectors, eg internet and other high-tech stocks. Over a relatively short time it could lead to a radical change in share ownership structure so that retail shareholders move into the majority in all markets. Nowhere will this be more marked than in countries like Britain where direct share ownership is very much a minority. The potential consequences for fundraising and investment banking, including its distribution channels, as well as for discretionary fund management at both a wholesale and a retail level are huge. More of that on another occasion.

The fifth proposition is that technology, in replacing many complex and high volume processes, will over time make them in general quick, simple, and extremely cheap, as well as totally automated, regardless of the cost or sophistication of the technical development, an inexorable and remorseless drive towards total commoditisation. The danger is to imagine that technical development will not grind on until the process is indeed totally commoditised.

The fact is that it doesn't pause as suggested by the cavalry officer who, in early days of the First World War, attended a demonstration of a tank, and solemnly pronounced that they would make wonderful gaps in the opposing infantry for the cavalry to go through.

The LIFFE market made exactly the mistake of believing that the status quo which had persisted for many years would continue for ever. In the event of course distribution eventually reached the desks of overseas members and was extended in many cases to the screens of their clients. The process of trading on the DTB was accomplished without human intervention, albeit with great technological sophistication behind the scenes, and the marginal cost of a transaction for all parties, exchange, broker, client, was minimal. Electronic exchange trading had become commoditised in a way that the open outcry system could not begin to simulate.

The process of securities settlement provides an important example for the future. Settlement is the process by which, as a result of a trade on an exchange, the ownership of a block of shares moves from the account of the buyer to the account of the seller. It is to a large extent a virtual process already; in other words nothing physical changes hands, most shares being held in a dematerialised or electronic form and the necessary electronic messages passing between the intermediaries – or brokers – acting on behalf of buyers and sellers, the exchange concerned, the relevant settlement systems and the depositories or custodians for the shares. And that's it. Nothing more than electronic messaging, albeit hugely clever.

Now behold the multitude of settlement systems across Europe, the unceasing discussion about harmonisation, the strategic mergers of for instance CedeI and the Deutsche Borse clearing, and strong competition between other settlement houses as well as share custodians. It's easy to imagine that it will always be like this. But it won't. The marginal costs of electronic transactions are minimal, and thus competition will inexorably drive prices down, which will lead to further mergers and harmonisation. Of course there are hurdles, particularly in the profusion of different settlement models and local legal and fiscal differences. But the underlying process is bound to continue, however slowly, until it ends up with a coherent, unified pan European and quite possibly global settlement system, costing very little per transaction. Indeed, as with exchanges, it may well end up in the ownership of global technology/communications and financial service institutions who will be the only players able to provide such a commoditised service at a profit. Of course it's impossible to predict how this will happen or even when, but happen it will, and maybe more quickly than might be expected.

The sixth and final proposition is that, in matters relating to technology, the timing of key strategic decisions is vital, neither too early or too late, but one can change to the other with great suddenness. Commercial history is littered with technology introductions which were ahead of their time, and which failed or were subsumed – the De Havilland Comet for one

and Clive Sinclair's electric car for another. In addition there may be other good reasons for delay in a world where technical innovation is coming in a mighty flood. If you decide and commit too early, you may lose the opportunity to use technology not yet developed which would have given you a technical edge.

Equally there are plenty more occasions when the introduction took place too late, and simply missed the boat or failed to stem the tide of change.

The closing days of the LIFFE Bund was just such of those, but it does raise a fascinating question: could the disastrous loss of the Bund contract have been avoided by a more positive vote in July 1997 at Hanbury Manor – in effect its last chance – or was it already too late?

Thus in one possible scenario, the Board might have voted overwhelmingly in favour of switching and redoubling the resources already going into the development of LIFFEConnect for equity options to a system dedicated to bonds, and then gone for broke for the earliest possible introduction. LIFFEConnect, seen as the first phase of automation, was already going very well and might have been ready for member testing with bondtrading functionality in the second quarter of 1998, and been fully operational shortly thereafter.

That might just have done the trick. But there are many 'ifs' in this alternative, not least the need then to go out and persuade a fractious and cynical membership.

Again, a positive vote by the Board endorsing electronic trading at an earlier date might have avoided the disastrous loss of the Bund. However it should be remembered that LIFFEConnect was then, and still I believe is, the most up-to-date system in the market, whereas the DTB's system was many years old, and creaking. A state of the art approach was probably needed to maximise the chance of success in a switch from open outcry to electronic trading against an entrenched competitor. It is therefore possible to argue that too early an introduction would have decreased its chances of success.

If ever there was one, this was a case of the need for timing and firmness of purpose, an excellent point at which to conclude a lecture. I will only say that in most modern offices across the globe strategies are being planned and decisions, large and small, are being made about technology. The six propositions may each have a greater or lesser degree of importance in such matters, but none will be more critical than good timing. And how do you measure that? I'm afraid that that's something that a machine can never do for you. So there is at least one area in which good old human judgement won't be replaced, after all.

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