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November 2011

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Abstract

This paper invites readers to look into how beliefs about future events help to better understand organizational change. Our argument is that the adoption of information technology and the adoption of new organizational forms around it have been driven by shifts in collective ideas of legitimate organizational development. As an example we focus on the establishment during the 1960s of a vision within US retail financial services, namely of the "cashless/checkless society". The article tells of the power of this "imaginaire" to bring consensus in driving actual technological developments.

Keywords: imaginaires, expectations, isomorphism, cashless society, payment systems, USA

Acknowledgements: We appreciate comments and suggestions of Walter Friedman, Lou Galambos, Katalin Ferber, Kevin Tennent and anonymous reviewers. The usual caveats apply.

"Why are the lines at automatic cash dispensers (so much for the paperless society) longer in the evening than those at the tellers' windows used to be during banking hours?"[1]

Introduction

History is the study of the past; of events that have already taken place. Notably in this journal and sister outlets, we have emphasized the study of the evolution of business organizations to better understand the development of capitalism.[2] In contrast, most people care primarily about the future. After giving a historical talk to a general audience we are used to being asked only what this tells us about the future. We tend to be reluctant to answer with tangible predictions knowing from our workaday immersion in the materials of the past that predictions are almost invariably wrong. So historians leave the future to others. But this places us at a disadvantage when dealing with the Digital Economy because, as we will argue in this article, explaining the adoption of technology and particularly information technology, is based on imagined futures as much as tangible innovation.

Our argument is not, we hasten to add, that history will somehow let us produce better and more reliable predictions of future events. Rather we believe that shared visions of historical inevitability were often a crucial and neglected factor in shaping the thoughts and actions of our historical actors. The development of careers, organizations, institutional fields, and technologies were shaped not just by perceptions of current conditions but by belief in particular future events, of desirable things to come.

From the 1950s onward technology companies, experts, consultants, and business professors have sold new technologies to business by presenting elaborate visions of a future world transformed by universal adoption of technology. Acceptance of these visions took place not just individually but also collectively, by industries and occupations. When technologies failed to perform as expected this could be characterized as a bump in the road to the future, rather than as a challenge to the inevitability of eventually arriving at the agreed destination. Once consensus on the future destination was reached a variety of specific systems or approaches could be presented as a step toward realizing this future goal,

[1] Edward Tenner (1996) *Why things bite back* (London: Fourth Estate): 5.
[2] Louis Galambos, "The Emerging Organizational Synthesis in Modern American History", *Business History Review* 44**,** no. 3 (Autumn 1970): 279-290; Christopher Kobrak and Andrea Schneider (2011) "Varieties of business history", *Business History*, 53(3): 401-424.

making the future a banner around which a heterogeneous alliance of interests could gather. This, of course, would further strengthen the power of the vision itself. The argument for business adoption of future technology has generally been made in the future tense.

We ground this suggestion within the "New Institutionalism" literature on organizational analysis. In a seminal article Paul J. DiMaggio and Walter M Powell explored the processes by which organizations in a particular field tend to grow more and more alike, which they dubbed "institutional isomorphism." This, they argued, reflected not just a set of independent and rational competitive responses to a changing environment but also a cultural process by which a consensus on the appropriate and legitimate institutional form evolved within a particular field. They identified three mechanisms for this change: coercive (for example from standards and regulations), mimetic (copying the reactions of peer institutions to environmental uncertainty), and normative (stemming, they believed, primarily from professionalization).[3] We suggest that mimetic isomorphism can function not just through copying the innovations of other organizations but by the acceptance of a shared vision of historical inevitability within an organizational field. Normative isomorphism is driven by the agendas of professional and occupational groups, which in turn often reflect acceptance within a professional community of a shared vision of the future.

The case for the importance of the future to historical decision-making can also be made from a number of other perspectives. Future expectations are fundamental to economic theory, guiding investment decisions and underlying formal mechanisms such as the calculation of net present value. Every business decision, therefore, involves a present and future element. Usually, however, these future visions are presented quantitatively, as a set of numbers extrapolating current trends. Walter Friedman has explored the history of Harvard's pioneering economic forecasting service[4] and written a biography of Irving Fisher, premier economist of the twentieth century, who wrote frequently on the importance of future expectations to business people. Says Friedman: "More than any other economist of his time, Fisher saw that a future-orientation among businesspeople and entrepreneurs was at the very core of business, and even more broadly, of capitalism."[5] In a similar vein, Carol Connell tells of the successful

[3] Paul J. DiMaggio and Walter W. Powell, "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields", *American Sociological Review* 48, no. 2 (April 1983):147-160.
[4] Walter A. Friedman (2009) "The Harvard Economic Service and the Problems of Forecasting", *History of Political Economy* 41, no. 1: 57-88.
[5] Walter A. Friedman (2008) "Irving Fisher, Economic Forecasting, and the Myth of the Business Cycle." *Harvard Business School Working Paper*, No. 08-037, p. 5.

efforts by Fritz Machlup to introduce scenario analysis as a method for collaborative exploration of alternative futures by senior teams in government and corporations.[6]

Sometimes expectations of future change inspire institutional innovation. For instance, Schumpeter's celebrated concept of free market innovation through the creative destruction of outmoded institutional forms depends on the existence of an entrepreneur (or entrepreneurial organization) who will see growth opportunities were no-one else has.[7] The organisation problem for the entrepreneur then becomes that of brining existing capabilities to bear on the new opportunity or creating the necessary new capabilities and structures.[8] But once introduced, successful entrepreneurs will be imitated because it is the attracting of other business people that which drives down entrepreneurial profits.

Successful innovation therefore depends, implicitly at least, on convincing others of the existence of a future in which the innovation is already accepted. Neil Pollock and Robin Williams have documented the role of industry analysts, such as the Gartner Group, in shaping the adoption of technology.[9] They categorized these "intermediaries specializing in the production, commodification and selling of future oriented knowledge" as "promisary organizations." The concept of an "imaginaire" (or "sociotechnical imaginaire") sometimes used in science and technology studies is also relevant. This French term is roughly equivalent to the term "vision" used here, reflecting an imagined new social order built around the deployment of an emerging, unproven technology in a particular way. The technology, in turn, is shaped by this vision.[10] Management consultants have proven important in the diffusion of fads and novelty within managerial discourse.[11] They have also been identified as key forces in the propagation of new technologies within business, a process documented by Brian P. Bloomfield and Theo Vurdbukais who argue in "The Vision Thing: Constructing Technology and the Future in Management Advice" that

[6] Caroll Connell (2011) "Reforming the world monetary system: How Fritz Machlup built consensus among business leaders and academics using scenario analysis", *Journal of Management History* 17 (1): 50-65.
[7] We appreciate the comments of Lou Galambos in pointing us to Joseph A. Schumpeter (2003 - 1943) *Capitalism, Socialism and Democracy* (London and New York: Routledge): 82; and to Joseph A. Schumpeter (1939) *Business Cycles,* New York, Toronto and London: McGraw-Hill: 19.
[8] Richard R. Langlois (2006) *The Dynamics of Industrial Capitalism* (London and New York: Routledge): 12.
[9] N. Pollock & R. Williams, "The Business of Expectations: How Promissory Organizations Shape Technology and Innovation," *Social Studies of Science* 40(4), 525-548.
[10] For example P. Filchy (2007) *The Internet Imaginarie* (Cambridge: MIT Press).
[11] Managers use narratives about new and fashionable techniques to communicate to organizational stakeholders that their organizations conform to institutional norms mandating the use of these techniques. This can explain the diffusion of management techniques across thousands of dissimilar organizations. See Eric Abrahamson and Gregory Fairchild "Management Fashion" *Administrative Science Quarterly* 44 (1999):708-740.

building a showcase facility demonstrating the retail world of the future allowed one major firm to construct both "expert knowledge and client ignorance" to promote its services. [12]

The reminder of this article illustrates the idea of mimetic and normative isomorphism through shared visions of the future of retail banking centered on the idea of the cashless-checkless society.[13] Originating in the 1950s, the cashless-checkless society vision was still operating as a powerful force for mimetic isomorphism during the 1980s and 1990s, supporting the deployment of inexpensive point-of-sale (POS) terminals that could capture personal identification numbers (PINs) and transaction details, standardized machine-readable cards, and single-message authentication and clearing networks. Variants of this vision appear throughout the developed world during the second half of the twentieth century, but for the sake of clarity and brevity, we will focus primarily on the form it took in the United States from the 1950s through the 1970s.[14] We explores its emergence, early conflicts to define the concept when trying to apply it by commercial banks, and a failed efforts by the VISA organization to deploy a comprehensive payments product in the early 1970s.

The Imaginaire of the Cashless-Checkless Society

So where do these imaginaires come from? What sphere do they inhabit? Some visions of the future feature prominently in the discussion of the proper role of information technology in business. For instance, in 1958 *Business Week* reported that the installation by General Electric in 1954 of an

[12] Bloomfield, Brian P, and Theo Vurdubakis. "The vision thing: constructing technology and the future in management advice." In Critical Consulting: New Perspectives on the Management Advice Industry, edited by Timothy Clarke and Fincham Robin, 115-129. Oxford: Blackwell, 2002. On consulting more generally, see Matthias Kipping and Lars Engwall (2003) *Management Consulting: Emergence and Dynamics of a Knowledge Industry* (Oxford: Oxford University Press); Christopher McKenna (2006) *The World's Newest Profession: Management Consulting in the Twentieth Century* (Cambridge: Cambridge University Press).

[13] Since the discussion deals with cash and payment systems, money is at the center stage. Money has unique qualities and has long had a charged political and cultural symbolism. But this paper is concerned not with the nature of money itself, nor the money supply, but with the *mechanisms* that allow a society to exchange means of payment. Of course, changes to these mechanisms can and did create anxiety amongst politicians and the general public, but those within the banking industry were focused more on how these changes might contain the costs of processing paper-based payments (including fraud). Computer technology was seen as key to achieve this aim. See further Bátiz-Lazo *et al.* (2010) *Technological Innovation.*In this context, the cashless-paperless society is a guiding principle for a collective. A guiding light that comes and goes out of fashion. Our aim here is to analyse how specific actions intertwined with the actors' expectations.

[14] A brief example to illustrate the variations in the use of the term "cashless society" can be found by searching Google's library of digitalized books (Google's Ngram Viewer). This search suggests that "cashless society" appeared in 1959, peaked at 2.00E-08 of all English books in 1973 and oscillated between that peak and 1.00E-08 until 2008. Whereas "electronic payments" appeared in 1962, peaked at 4.00E-08 in 2000 and remained well above 3.50E-08 thereafter until 2008. One can only speculate the reasons for this behavior but, perhaps, the negative connotations of "cashless" has limited its use; whereas "electronic" has a more modern, forward looking ring to it.

automated payroll processing for its Louisville, Kentucky plant (using technology originally designed for military purposes) had been the start of a "new industrial revolution"[15] which it characterized as "perplexing and disgruntled—but inevitable… because computers still hold the key to new systems or organization for the sprawling giants of industry, commerce, and government…"[16]

In fact the Louisville project was a debacle, as the new system took much longer to implement and accomplished much less than expected. Other early adopters of computer technology faced similar problems. Yet this sense of historical inevitability served the computer industry well in the decades to come. As you may recall from the "productivity paradox" debate of the late 1990s, it is only in the past few years that economists have been able to state with confidence that the massive investments made by business in information technology have actually improved corporate performance.[17]

Other visions of the future of technology emerge within and are shaped by the interaction of people with similar interests. For instance, the late Rob Kling wrote frequently of the power of "computerization movements," stressing the role of social groups in constructing the apparent inevitability of technological change.[18] These movements spread in industry associations as well as occupational groups. Within the study of financial intermediation, JoAnne Yates has explored the importance of the Life Office Management Association, a trade group, in shaping technology use within its industry. Similar developments have also been documented for Spanish and Swedish savings banks, where, as was the case for the US insurers, long before any single firm had an established and stable computing operation, association members were swapping ideas, sharing initial experiences, and legitimating particular applications of the new technology.[19]

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[15] Roddy F. Osborn, "GE and UNIVAC: Harnessing the High-Speed Computer", *Harvard Business Review* 32, no. 4 (July-August 1954):99-107.

[16] Idem.

[17] This "paradox" refers to the claim by Robert Solow, economist at the Massachusetts Institute of Technology and Nobel Laureate in Economics (1987), that "the computer revolution is everywhere but in the productivity statistics". Although scholars (including Solow) now agree that information technology has played an important role in the acceleration of productivity in the USA since 1973 (and particularly between 1995 and 2000), there is far less agreement on the extent to which applications of computer technology have contributed to this productivity revival. Reasons for this disagreement include methodological differences between estimates, which create a wide variation on the size of the effect. However, there is some agreement that there are large differences in the effects of IT investments between firms, with some reaping extraordinary productivity gains and others little or no gain. See further Eric Brynholfson and Adam Saunders, *Wired for Innovation* (Cambridge MA: The MIT Press, 2010).

[18] Rob Kling and S Iacono, "The Mobilization of Support for Computerization: The Role of Computerization Movements", *Social Problems* 35, no. 3 (June 1988):226-343.

[19] JoAnne Yates, *Structuring the Information Age* (Baltimore: Johns Hopkins University Press, 2005); Bernardo Bátiz-Lazo and J. C. Maixé-Altés "Managing Technological Change by Committee: The Origins of Data Processing Networks in Spanish and British Savings Banks (c. 1960-1988)" *Revista de Historia Industrial* 47 (November 2011):

Yates has also documented the importance of Edmund Berkeley, a procedures expert at Prudential Insurance, in launching the automation movement within the Life Office Management Association.[20] Berkeley not only persuaded his employer to become the first business to order a programmable electronic computer but also wrote *Giant Brains*, the first popular guide to computers. [21] This did a great deal to shape the vision of the future around which the computerization movement gathered. Berkeley discussed the actual capabilities of the first computers, but presented this information primarily as a set of clues to what would be accomplished by the machines of the near future. He forecast automatic translation and handwriting recognition as immediate applications, with weather control, automated psychiatrists, and pocket machines to calculate income tax and store addresses to follow later. In its final chapter he explored the potential hazards of this future, worrying about the dangers that robots would revolt or be used destructively by "antisocial human beings" and proposed an international regime of inspections to avoid it. He concluded with the promise that can "welcome the robot machine as our deliverer from the long hard chores of many centuries."

This seems to have set a template for other writers concerned with the role of information technology in business. Indeed, the very term "information technology" was introduced in a 1958 *Harvard Business Review* article called "Management in the 1980s."[22] Its authors treated their readers to a sketch of managerial practice in the far-off world of the late twentieth century, by which point the computer revolution would have run its course. Its authors promised that a computer would be world chess champion by 1968 and, more relevantly, that "top management [will] become more abstract, more search-and-research oriented and correspondingly less directly involved in the making of routine decisions…." (272) This futuristic would be more hospitable to academics, "researchers, or people like researches, will sit closer to the top floor of American companies… we might expect more impersonal, problem-oriented behavior at the top, with less emphasis on loyalty to the firm and more on relatively rational concern with solving difficult problems." (272/273) This is a nice example of the tendency of particular groups to put their own spin on shared futuristic visions, emphasizing their own areas of expertise.

117-150; Bernardo Bátiz-Lazo, Tobias Karlsson and Bjorn Thodenius, "Building Bankomat: The Development of On-Line, Real-Time Systems in British and Swedish Savings Banks, c.1965-1985", *Association of Business Historians Annual Conference* (Liverpool: 2009).

[20] JoAnne Yates, "Early Interactions Between the Life Insurance and Computer Industries: The Prudential's Edmund C. Berkeley", *IEEE Annals of the History of Computing* 19, no. 3 (July-September 1997).

[21] Edmund C. Berkeley, *Giant Brains or Machines That Think* (New York: John Wiley & Sons, 1949).

[22] Harold J. Leavitt and Thomas L. Whisler, "Management in the 1980s", *Harvard Business Review* 36, no. 6 (November-December 1958):41-48.

However, hunts for earliest speculative depictions of particular technologies most often lead us to the world of science fiction. Jules Verne wrote about space travel, air travel, and long-range submarines decades before such things existed. H.G. Wells warned of the dangers of aerial bombardment prior to the First World War. As science fiction emerged as a distinct genre in the 1930s and 1940s its practitioners prided themselves on their scientific knowledge and skillful extrapolation. Arthur C. Clarke claimed to have been the first to conceive of a geosynchronous communications satellite while moon missions, space stations and atomic weapons were fictional commonplaces long before their actual debut. The 1990s saw the spread of the Internet into business and an accompanying media frenzy around the idea of doing business in "cyberspace." The latter was quite literally a science fiction concept, coined by fiction writer William Gibson.[23] More prosaically, Robert A. Heinlein took credit for the waterbed.

In contrast, the vision of a "cashless society" appears to have originated within the world of business and moved only later into the realm of fiction. On the one hand, the genesis of the idea is associated with the computerization of retail financial intermediaries. Banks in both sides of the Atlantic began to adopt computers and telecommunications starting in the 1950s. As early as 1954, business technology researchers and consultants in the USA started to discuss the possibilities of a "checkless society" where sleek, efficient, and safe electronic messages would replace cumbersome, costly, and easily-forged paper checks.[24] Once the major banks digitized their accounts, they argued, it would be relatively simple to connect their computers over a telecommunications network, and process most routine payments entirely in electronic form. A few of them even predicted that paper notes and coins would eventually be replaced by a nationwide electronic funds transfer system (EFTS), activated by some kind of economic identification card, ushering in a completely "cashless-checkless society."

On the other hand, readers and writers of science fiction were perhaps more interested in rockets and physics than they were in banking, economics, or organizational innovation. When a fictional society was cashless it was generally also a moneyless utopia, as with the payment cards used by citizens to spend their standard allocation of "credit" in Edward Bellamy's highly influential socialist novel *Looking*

[23] The startlingly rapid process by which "cyberspace" passed from science fiction into business and political discourse is explored in Turner, Fred. From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism. Chicago: University of Chicago Press, 2006.

[24] See Robert Gregory and Herbert Jacobs, Jr., "A Study of the Transfer of Credit in Relation to the Banking System," MIT Dynamic Analysis and Control Laboratory Report no. 87 (1954). The term was then introduced in Britain by the New York correspondent of the *Financial Times* in 1966 as a response to a study by the Diebold Group into the subject ("Towards a cashless society", *Financial Times*, August 6th, 1966, p. 3).

Backward (1888).[25] Capitalism was the default social organization of American science fiction, but few authors put much attention into imagining its future.[26] By the 1940s many had adopted the term "credit" as the universal name for future currencies, including Isaac Asimov for his two main strands of work (the far-future Foundation saga and the near future Robot stories). Usually, however, this functioned as a simple linguistic substitution for "dollar" and one reads of credits being slapped onto counters, flung to parking attendants, drawn from pockets, and the like. So for most authors use of the term did not imply automatic processing of payments. A partial exception can be found in the early work of Robert A. Heinlein, whose interest in economics and the workings of capitalism was unusual among the science fiction writers of his generation. His utopian early novel *Beyond This Horizon* (1948) described a communications network spanning North and South America. An automated cash register, which he dubbed the "auto-clerk" would encode every sales transaction onto paper tape. These were aggregated and fed into a "huge integrating accumulator" (i.e. a computer, to use the term that had not yet been standardized) in the Department of Finance.[27] However the function of this machine was to make macroeconomic corrections to keep the economy running smoothly, rather than to maintain individual accounts.

Although the cashless-checkless society remained mostly a banker's dream throughout the 1950s and early-1960s, by the mid-1960s its advocates could make a persuasive case for the need to consider electronic replacements to paper checks. Over the decade, the volume of checks processed by the Federal Reserve had risen from 14 billion a year in 1955 to nearly 22 billion (about 60 million *each day*), and the projected rate of growth for the next decade was even higher.[28] Even with magnetic ink character recognition (MICR) and high-speed check sorters, the Fed was already finding it difficult to keep up with the explosive volume. This increasing volume was also incurring a significant monetary cost. At this time, all paper checks written in the United States had to be physically sorted, routed, and

[25] Edward Bellamy (2000) *Looking Backward*, London: William Reeves [1888].

[26] Leading in some cases to inconsistencies, such as those of the Star Trek universe. See http://www.sffchronicles.co.uk/forum/16664-money-in-star-trek.html (accessed 24 June 2011).

[27] Robert A Heinlein, *Beyond This Horizon* (Reading, PA: Fantasy Press, 1948), 3-7. See also the discussion of economics and the role of government on pages 71-72 and 102-3.

[28] Norris Lee, "Tomorrow's Checkless, Cashless Society: the Problems, the Solutions, the Benefits," *Management Review* (September 1967): 58-62. Another contemporary study estimated a similar trend but of different magnitude as it stated that approximately one and a half billion checks were cleared in the USA in 1939, and this volume increased to 6.5 billion in in 1950 and to 13 billion in 1960 (Boris Yavitz, *Automation in Commercial Banking*; New York, 1967, p. 11). Both these estimates concur in identifying a spectacular rise in check volume and activity, with no corresponding increase in the value of deposits, thus placing a severe strain on the US banking system.

delivered to the issuing branch before the check was settled and final payment made.[29] This process incurred not only significant handling and transportation costs (estimated at $3.5 billion per year), but also "float" costs for the depositing institution until settlement was received.[30] Handling costs are per-check, but float costs are per-dollar, so any further increases in volume, or delays in clearing, would result in significant cost increases.[31] This talk of a crisis was itself speculative – during the 1960s the American banking industry was heavily regulated, highly fragmented, reliably profitable without any driving need for operational efficiency, and stable to the point of dullness. If it was hard for a bank to fail then it was also hard for a banker to stand out. Indeed the high technology vision of the cashless-checkless society seems to have appealed to younger and more ambitious members of the industry as a way of overcoming the image of their industry as a conservative backwater.

Discussion of the power of new computer technology to transform business and management was a staple of the American business literature of the 1960s. Haigh has written of the importance of the idea of the "totally integrated management information system," a massive online computer system automating all routine business processes, providing every manager with exactly the information needed to carry out their duties, and incorporating advanced simulation and forecasting techniques. This vision held together a powerful alliance of computer vendors, consultants, academics and other experts for much of the decade – even though no company succeeded in building a system of this kind.[32]

Two actors in particular seem to have established the initial framing of this volume crisis and promoted the concept of the cashless-checkless society as the appropriate solution. The first was John Diebold, who had earlier popularized the term "automation." His consulting firm, The Diebold Group, constructed several networked computer systems for commercial banks in the early 1960s, and began researching

[29] This remained true until 2003, with the passage of the "Check 21" act.

[30] While the check passed through the clearing system, which could take several days, the depositing institution had to pay interest on the deposited funds and often make some portion of those funds available to the depositor, even though the depositing bank would not receive payment from the check-issuer until the clearing process was complete.

[31] These costs were also more pronounced in the United States than in other countries due to several reasons. These included the sheer number of banks. In 1966, there were 14,000 banks in the nation, so the likelihood that a check needed to go through the national clearing system was higher than in countries with fewer banks per capita. Another reason was that the use of personal checks in the USA was much higher than other countries. In Spain, for instance, their penetration as a means of payment remained negligible even after the introduction of check guarantee cards in 1971 (see further Bátiz-Lazo and Maixé-Altés "Managing Technological Change by Committee", *op. cit.*).

the more general impacts of automation on the banking industry as early as 1966.[33] Diebold himself also wrote articles in leading business journals, warning of an impending "transaction overload" and stating that "the 'cashless society' is no longer an option but a necessity…."[34] Although he acknowledged that there was "considerable vagueness" surrounding the actual details of how such a society might be achieved, he nevertheless argued that "some system must and will develop in which money (and credit) moves quickly and safely" around the world.

This vision won influential support from George Mitchell, a member of the Board of Governors of the Federal Reserve, who began warning bankers in 1966 of the increasing costs of processing paper checks, urging the banking industry to consider how "the computer can drastically change money and its use."[35] Electronic payments, he argued, would reduce both the handling and float costs, as transfers could be achieved nearly instantaneously. He predicted that the use of checks would disappear within "the discernable future, probably much sooner than most of us expect," and that paper notes and coins would soon-after be relegated to increasingly limited uses.[36]

Despite a lack of concrete details, these early social entrepreneurs did help convince the American Bankers Association (ABA) to begin investigating the possibility of a cashless-checkless society in 1967. Dale Reistad, the ABA's Director of Automation, predicted that it was "nearly inevitable that the banking system…will reverse itself and develop a 'checkless' system" by 1980, soon followed by a drastic reduction in the use of cash by businesses and consumers.[37] He also formed a "Checkless Society Committee" to determine "if the American economy can really function without bank checks" and answer the question "what must the banking industry do today to prepare for the eventualities of the future?"[38] The committee invited equipment vendors to demonstrate their most advanced wares, and encouraged them to develop point-of-sale terminals capable of initiating transactions in electronic form. The committee also asked retailers to parley about strategies for transitioning towards a checkless, and

[33] Diebold Group, *Summary Report of a Survey on the Impact of Electronics on Money and Credit* (1966)
[34] John Diebold, "When Money Grows in Computers," *Columbia Journal of World Business* (Nov-Dec 1967): 39-46.
[35] George Mitchell, "Governor Mitchell Considers Tomorrow's Banking," *Banking* (Dec 1966): 33-34. In a parallel development, the narrative of cost reduction to justify capital investments around computer technology was quite common in the early and mid 1960s in several European countries. See further Bernardo Bátiz-Lazo, J. Carles Maixé-Altés and Paul Thomes, *Technological Innovation in Retail Finance: International Historical Perspectives* (New York: Routledge, 2010).
[36] George Mitchell, "Effects of Automation on the Structure and Function of Banking," *The American Economic Review* (vol. 56, no. 1, Mar 1966): 159-166.
[37] Dale Reistad, "The Coming Cashless Society," Business Horizons (Fall 1967): 23-32. The "reversal" he referred to was a move away from making the processing of paper checks more efficient in favor of completely electronic clearing.
[38] "Checkless Society Check," *Banking* (May 1967): 115.

then eventually cashless retailing environment. And most importantly, the committee held a number of workshops on electronic payments for bankers across the nation, establishing a common vision that would guide the actions of many bankers for the next several decades.[39] A computerization movement was well underway.

Advocacy for the adoption of computers and telecommunications tended to come from the middle levels of management, not the upper levels. A good example in the US is Citibank's John Reed, who joined the bank in 1965 after graduating from MIT's Sloan School of Management. In 1969, at the tender age of 29, he took over Citibank's Operating Group, and began to automate their entire back office. By the time he was done six years later, the back operations "more closely resembled an assembly line at General Motors than anything bankers were used to…." Reed then moved on to lead Citibank's push into consumer banking services (which was rooted in automated, self-service terminals), eventually taking over as Chairman in 1984.[40]

The same trend is evident in several European countries. For instance, prior experience with automation and the deployment of mechanical and electromechanical accounting devices in British banks, savings banks and building societies placed accountants and/or staff at Operations and Methods Departments making critical decisions in the selection and adoption of computer equipment.[41] Bátiz-Lazo *et al.* document how the computerization of Swedish savings banks was spearheaded by a group of young managers under the leadership of Sven G Svensson director of *Sparfrämjandet* (the propaganda department of the Swedish savings banks association).[42] During the 1950s they met at annual conferences the 1950s at the resort town of Saltsjöbaden (in the Stockholm archipelago). They were united by the idea that the savings banks had to adjust to on going social change and meet the challenge of commercial banks (not by demanding protection from the state but by introducing better services). The computerisation of banking services was seen as key aspect to meet these challenges. Many ideas that came out of the conferences at Saltsjöbaden were implemented during the 1960s as the attendants

[39] " 'Checkless Society' Moves Toward the Drawing Board," *Banking* (August 1967): 93. The chairman of this committee also used the banking and business trade press to sell the vision—for example, see Robert L Kramer and W Putnam Livingston, "Cashing in on the Checkless Society," *Harvard Business Review* (Sept-Oct 1967): 141-149.

[40] Joseph Nocera, *A Piece of the Action: How the Middle Class Joined the Money Class* (New York: Simon and Schuster): 141-144. The role of middle management in triggering the organizational adoption of new technologies and shaping their deployment is documented in Thomas, Robert Joseph. What Machines Can't Do: Politics and Technology in the Industrial Enterprise. Berkley, CA: University of California Press, 1994.

[41] Bernardo Bátiz-Lazo and Peter Wardley, "Banking on Change: Information Systems and Technologies in UK High Street Banking 1919-1969" *Financial History Review* 14, no. 2 (2007): 177-205.

[42] Bátiz-Lazo *et al.* "Building Bankomat", *op. cit.*

reached influential positions within the savings banks. In Spain, it was middle managers of savings banks who regularly staff the meetings of the "Commission of Operations and Automation" (known as COAS by its Spanish acronym). This was a committee based at their national association (known as CECA by its Spanish acronym) and the backbone of the computerization of Spanish savings banks.[43]

Inspired by this vision, as well as the potential to leap ahead of their competition, several banks in the late 1960s and early 1970s conducted cashless-checkless "pilot projects" to determine whether such a system would be technically and socially feasible. The Bank of Delaware in Wilmington conducted what may be the first such test in 1967, "enabling retailers to receive instant payment for merchandise at the bank via their customers' machine-readable identification cards."[44] In 1971, the President of the City National Bank and Trust (CNBT) of Columbus, Ohio noted that its "electronic funds transfer pilot test" was intended to "peek into the future and learn the sequence of social and technological developments that will bring about a society where most sales involve the electronic transfer of data and funds, instead of cash and checks."[45] These types of tests were well-covered in the banking trade press, which helped to legitimize the idea of a cashless-checkless society amongst American bankers.

Bankers were also quick to see a potential connection between the machine-readable cards used in these pilot projects and the rapid spread of new bank-issued credit cards under the new Interbank association and BankAmericard licensing system (i.e. the genesis of VISA), both of which began in 1966, just as the cashless-checkless society vision was winning acceptance. Surveys from the time also indicate that at least 70 percent of bankers believed that credit cards were the first step towards the cashless-checkless society, and that they were entering that business in order to be prepared for what they saw as an inevitable future.[46]

This vision of a cashless society spread with equal speed beyond the community of banking technology enthusiasts and into broader communities. In his 1968 book *2001* (developed in parallel with the film), Arthur C. Clarke depicted a telephone call placed from space thus: "Floyd, after checking that the Area Code for the United States was still 81, punched his twelve-digit home number, dropped his plastic all-purpose credit card in the pay slot, and was through in thirty seconds." (p.51)[47] Two years later the book *Tomorrow's World* (based on a British television series profiling new inventions) included as an appendix

[43] Bátiz-Lazo and Maixé-Altés "Managing Technological Change by Committee", *op. cit.*
[44] Kramer & Livingston: 146.
[45] C Gordon Jelliffe, quoted in *Payment Systems Newsletter* (July 1971): 6.
[46] David Stearns, *Electronic Value Exchange: Origins of the VISA Electronic Payment System* (London: Springer, 2011); The Diebold Group, "Summary Report of a Survey on the Impact of Electronic on Money and Credit" (1967).
[47] Clarke, Arthur C. 2001: A Space Odyssey. New York: New American Library, 1968.

drawn from the emerging field of "futurology" to provide a comprehensive timeline of the near future. Most entries now appear ludicrously optimistic (a Soviet Mars landing in 1988; fusion power in 1996; a polar ice city with a population of 500,000 by 1988). In contrast the entries concerning information technology reflect technological goals that were largely met, even if the authors underestimated the ability of old and new to coexist. Computer terminals were to enter the home by 1980, the last national newspaper would close down in 1990, a "world computer-information bank" was to be established in 1994, and in 2008 the "Bank of England withdraws cash and notes in favor of credit-card economy."[48] The show itself had featured a lengthy imagined depiction of this cashless future, bolstered with models of an ambitious real-time banking system under development by Barclays Bank.[49]

Within a five year period from 1965 to 1970 the checkless-cashless future had passed from a somewhat marginal speculation to a taken for granted part of the industry's conventional wisdom. No such payment system was in commercial operation, or had been proven in a pilot study of more than trivial scope. In fact the technology to realize the vision did not yet exist, as a series of failed projects in the financial industry during the late 1960s and early 1970s would demonstrate.[50] Nevertheless trade associations, technology suppliers, leading banks, industry commentators and consultants had all endorsed it as not just desirable but inevitable. In the language of the new institutionalism, a new and in some respects quite different kind of bank (with some core operational activities deleted and others added) had been successfully institutionalized within this organizational field as the future organizational form. Any bank that failed to endorse the new consensus would sacrifice legitimacy and be seen as conservative and marginal. Any ambitious young banker would be well advised to cast his (or occasionally her) lot in with the new order.

Conflicting Definitions of the Cashless-Checkless Society

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[48] Baxter, Raymond, and James Burke. Tomorrow's World. London: British Broadcasting Corporation, 1970.

[49] The Tomorrow's World segment"New Banking" was broadcast on December 9, 1969 and can be seen at http://www.youtube.com/watch?v=ccqYKoLbT3I. The Barclays project is discussed in Ian Martin (2010) '"Too Far Ahead of its Time": Britain, Burroughs and Real-Time Banking in the 1960s", *Society for the History of Technology Annual Conference;* Ian Martin, "Britain's First Computer Centre for Banking: What did this Building Do?" in *Technological Innovation in Retail Finance: International Historical Perspectives*, Bernardo Bátiz-Lazo, J. Carles Maixé-Altés and Paul Thomes (eds.)(Routledge, 2010), 37-70.

[50] In the early 1970s the merger of cash dispensers and computing technology was yet to happen but when it did "it will also be technologically possible to bring in the same system many of an individual's purchases and other money transactions so the much discussed concept of immediate, electronic transfer could well take off at the time." Kenneth Owen (1971) "Bank technology: Its an all-computed cash dispensing world", *The Times*, Nov 5 1971, p. 23, Col A.

Consensus within the banking industry was established around this negative vision of the elimination of cash and checks, rather than being framed as a positive alternative such as "the electronic payment society" or "the credit card society." This is not coincidental. There was a broader range of support for the idea of eliminating cash and checks than for replacing them with any particular alternative, giving the term what sociologists of science like to call "interpretative flexibility." Yet this flexibility could only be retained for a limited period. By the early 1970s, the expectation of a coming cashless-checkless society was generally assumed, but as new actors and their organizations became involved in the discussion, the details of how exactly this sort of a society might come to fruition became contested and cloudier. Although futuristic visions can ultimately result in mimetic isomorphism, it is also important to realize that during the formation of these visions, various actors will struggle to define the particulars of that vision in terms that are most favorable to themselves. Actors that are most successful at enrolling other actors into their particular definition of the vision tend to "win," not only strengthening their economic position in the industry, but also their ideological control over it.

In the early 1970s, there were six primary actor groups vying for control over the structural details of the cashless-checkless society. The first was the Federal Reserve, with George Mitchell being their most vocal representative. Not surprisingly, the Fed wanted to remain at the center of the cashless-checkless society, and thus wanted to construct the electronic analog to their existing, centralized check clearing services.

The large, technically-advanced commercial banks formed the second group, and their position was most clearly articulated by John Reed of Citibank.[51] Reed saw electronic payments as a competitive weapon, something that would allow innovative banks like his to displace those that were slower to adapt. Thus he advocated the competitive development of proprietary electronic funds transfer (EFT) systems. This was the same model most banks were adopting for their budding automated teller machine (ATM) networks, and Reed saw the point of sale as just another kind of cash machine. Other banks could gain access to Citibank's EFT system, but only for a fee, and only on Citibank's terms.

The smaller, less technically-savvy banks formed the third group, and their position was articulated by James E Brown of Mercantile Trust Company of St Louis.[52] Concerned that the larger commercial banks would use their technical expertise to consolidate the banking industry. He favored the development of a shared EFT infrastructure managed either by the Fed or by regional associations. He argued that

[51] John Reed, "The Case for Own-Your-Own," *Banking* (Oct 1972): 20.
[52] James E Brown, "The Case for Shared Terminals," Banking (Oct 1972): 20

point-of-sale terminal networks were more akin to mailboxes or telephone lines than ATMs, there being no value to consumer or merchant in having multiple incompatible terminals and cards. Brown's concerns were also motivated by the very real possibility that the Citibanks of the nation could easily turn the smaller banks into tenant farmers.

The fourth group consisted of the credit unions, savings & loans, and mutual savings banks, collectively known as the "thrifts." Their position was articulated by Norman Strunk, Executive Vice President of the League of Savings Associations.[53] Because they were originally chartered to promote consumer saving, the thrifts could not issue checks; customers were required to visit their branch in person and withdraw cash.[54] A cashless-checkless society promised them new service options, provided of course that they were not barred from participating. The thrifts favored a shared system run by the Federal Reserve, as they felt that this gave them the best chance of having access to whatever EFT system would be developed.[55]

The fifth group consisted of the large national and regional retailers. In many ways, large retailers such as Sears and Wards were in a better position to offer a nationwide EFT system than the banks were: they issued more credit cards than all the banks combined; they had "branches" throughout the country that were open late and on weekends; they had an extensive network of electronic cash registers capable of making electronic deposits and withdrawals from cardholder accounts; and many already cashed payroll checks for their working-class customers. The retailers were typically not invited to the various banking industry discussions about the cashless-checkless society, sparking Gordon Worley, the Vice President of Finance for Montgomery Wards, to warn the bankers not to ignore them: "I think the banks should co-operate with us on this because, if they force us to go our own way, they could find themselves locked out."[56]

The national credit card associations made up the sixth and final group, and their most vocal and assertive spokesperson was Dee Hock, CEO of the organization that would soon be rebranded as VISA.[57] Hock saw his own organization at the center of an international EFT system. He favored a shared

[53] "When We Achieve a Nationwide Electronic Funds Transfer System," Banking (May 1974): 29-32+
[54] Several states began allowing the thrifts limited third-party payment instruments in the early 1970s, but this was not universal. These accounts were known as Negotiable Order of Withdrawal, or NOW accounts.
[55] Strunk mentioned in the article that the thrifts had been barred initially from the new automated clearinghouse in California, and were allowed access only after the Federal Reserve exerted pressure on their behalf.
[56] "Banking at the Chain Store—Closer Than You Think," *US News and World Report* (16 Sept 1974): 77
[57] The organization was named National BankAmericard Incorporated until 1977. Technically, VISA is a recursive acronym for Visa International Services Association, but it is commonly referred to simply as "Visa" after first use. For a history of Visa's origins, see Stearns, *Electronic Value Exchange*.

cooperative system that would give as much access to small rural banks as it did to large money-center ones. But he also favored the development of several of these types of cooperative systems, creating competition at the system level so that there would still be an incentive for innovation.

Visa and the Cashless-Cashless Society

As a mid-level manager in a Seattle-area bank in the mid-1960s, Hock had become enamored with the possibility of what he would later term "electronic value exchange." His ideas were no doubt influenced by the cashless-checkless society vision of the 1960s, but he saw a potential that went far beyond a simple electronic analog to the existing check clearing system. He envisioned an "asset card" that could instantly access any pool of funds the cardholder might possess—deposits, lines of credit, liquid investments, etc.—at any time of day and from any location in the developed world. Merchants would happily accept it because payment would be guaranteed, just as bank-issued credit card transactions were. Cardholders would love it because they could have safe access to their funds whenever and from wherever they happened to be. And the banks would eagerly embrace it because it would allow all of them, even the small community banks, to offer a comprehensive set of services to their customers.

It sounded like a win all around, and the organization launched its first product based on the idea in 1975, the Entrée debit card. This card looked similar to its credit card cousin, was accepted in all the same places, and its transactions could be authorized and cleared electronically thanks to Visa's recent BASE I and II computer systems. Only a handful of banks, less than one percent of Visa's membership, decided to issue it to their customers. This may seem surprising, as 70 percent of bankers polled a decade earlier had believed that the national credit card networks were the first step towards the cashless-checkless society, and now Visa was offering them a functional, electronically-processed debit card with established, widespread acceptance. Although the Entrée card most certainly fit into the *general concept* of the cashless-checkless society it clashed significantly with the *detailed definitions* of that society being promoted by other, more-powerful bankers.

The Entrée card clashed in two significant ways. First, it operated in a different way. The card was designed to be accepted wherever the existing credit cards were accepted, which meant that it had to be authenticated with a signature and not a personal identification number (PIN) or other biometric test. Point of sale (POS) terminals that allowed cardholder input were available from a few manufacturers, but were very expensive and thus were not yet widely adopted by merchants. Merchants could use a terminal (or the telephone) to authorize the transaction, but would still need to deposit a paper sales draft at their bank, where it would be captured and cleared electronically. This

would permit overdrafts, though no more so than the paper checks the card was designed to replace and only until the electronic data-capture terminals were widely adopted. Still, for many bankers the cashless-checkless society meant "no more overdrafts," and they were unwilling to accept any EFT solution that contradicted this.

Second, the Entrée card embedded a different set of assumptions about the competitive structure of the industry. Larger banks tended to favor private, non-shared EFT systems, but the Entrée card was subject to same principle of universality as the credit card: every bank that participated in the system must accept transactions for all cards. Even banks that favored a shared, cooperative solution might be happy to accept transactions from out-of-town banks, but wanted to deny access, or at least charge a fee, to their rivals down the street. Hock had crafted the operating regulations of his system to prohibit these kinds of selective barriers. This kind of behavior had almost destroyed the BankAmericard licensing system in 1968, and his new organization was not going to make the same mistake less than a decade later.

In addition to these two primary differences, there was also a cultural divide in American banks at this time that worked against the Entrée card's acceptance. Bank credit cards grew out of the consumer credit side of the banks, not the deposit side, and even though the credit cards often contributed significant revenues to the banks bottom line, they were never considered to be "real banking." Credit card program managers were considered to be one step above pawn brokers and loan sharks, and were often physically located far away from the stately lobbies and commercial loan desks. The deposit side tended to have the organizational power in any given bank, and thus it was the deposit side that defined the bank's EFT requirements and plans. These bankers imagined a cashless-checkless society patterned after ATMs rather than credit cards.

Visa debit cards would eventually succeed, but the initial failure of the Entrée initiative demonstrates both the power and the limitation of the cashless-checkless society vision in guiding the actual institutional development of the industry. This vision established a consensus regarding certain aspects of the future (clearly there would be no checks) while leaving flexibility in others. Innovators like Hock could draw on the established vision to legitimate their own plans, but even an initiative closely aligned with the established future vision would not succeed unless it reflected the interests of a sufficiently powerful alliance of stakeholders. Going against the established future vision would likely mean failure, but working within it did not guarantee success.

Conclusions

Fifty years after it first emerged, the idea that clumsy and expensive-to- handle coins and notes could be replaced by efficient electronic payments (initiated by various types of plastic cards, chip cards or more recently, mobile phones) is still heralded as a tantalizing prospect for the twenty-first century.[58] In some countries the process is quite advanced. In the European Union, Iceland is the most cashless society as measured by purchase value in shops, where only about 9 percent of the turnover is paid by cash.[59] In Turkey telecom operators (Turkcell), banks, authorities and a private e-identity service-providing company (E-Güven) have agreed upon a common SIM-based identification solution. As a result, Turkish customers can use their mobile phone for secure connections to online banking, government services etc.[60] The success of mobile banking solution M-PESA in Kenya has been noted to provide important insights into the functioning of payment systems that go beyond interoperability issues in the interaction between financial services and telecoms.[61] In Hong Kong, major transport operators launched in September 1997 a contactless card primarily for transport ticketing. In 2011, the "Octopus" card had over 11 million daily transactions of which about 40 percent were non-transport, small value payments such as vending machines or fast food restaurants. Indeed, in many countries to pay with cash is to mark oneself a potential criminal or terrorist (so much so that large transactions must be reported to the government). But the assumption remains that the growth in automated payment volumes (direct debits, standing orders and customer credits) together with increasing use of plastic cards (and/or mobile phones) will triumph as the premier payment method(s) and will substitute for checks and cash. The discourse of banking technology is still written in the future tense.

[58] Steve Worthington, "The Cashless Society", *International Journal of Retail & Distribution Management*, 1995, vol. 23:7, pp. 31-40. The popular press is full of references to idea of using smart cards or mobile phones to replace cash payments. See for instance, "Challenges to a cashless world" http://news.bbc.co.uk/1/hi/business/7876154.stm (accessed June 20, 2011); "Nearfield communication transforms travel in Japan" http://www.bbc.co.uk/news/business-13216267 (accessed June 20, 2011); "Your concerns about a cashless society" http://news.bbc.co.uk/1/hi/business/7894666.stm (accessed June 20, 2011). To date there are no detailed long-term estimates of the time required to make a full technological transition within retail banking. For an approximation see Bernardo Bátiz-Lazo and Douglas Wood "An Historical Appraisal of Information Technology in Commercial Banking". *Electronic Markets* 12, no. 3 (2002): 1-12; K. Garbade and W. Silber. 1978. "Technology, Communication and the Performance of Financial Markets: 1840-1970". *The Journal of Finance* 33, no. 3 (1978): 819-32; J. M. Pennings and F. Harianto "The Diffusion of Technological Innovation in the Commercial Banking Industry" *Strategic Management Journal* 13, no. 29 (1992): 29–46.

[59] Erkki Liikanen, "Electronic and Mobile Payments – Moving towards a Cashless Society?", *BIS Review* 40 (2008): 1-5.

[60] Idem

[61] Michael Klein and Colin Mayer, "Mobile Banking and Financial Inclusion: The Regulatory Lessons", *Frankfurt School of Finance and Management* (Working Paper 166), Frankfurt (2011), http://econstor.eu/bitstream/10419/48654/1/664524133.pdf (accessed November 18, 2011).

At the same time, however, the world we live in is similar to, and in many ways created by, the vision of a checkless-cashless society institutionalized within the banking industry during the 1960s. Within banks, computer technology has greatly reduced paper-based transactions with human tellers and, more recently, with automatic teller machines. Middle class Americans still have checkbooks and still carry cash, but they reach for them far less frequently than before. Many grocery stores and small merchants no longer welcome personal checks. Major purchases are almost invariably charged to debit or credit cards, authenticated with either a PIN or a signature depending on the context of use, and most can access a line of credit if there are insufficient deposits to cover the transaction. Small transactions are increasingly processed the same way. Across the Atlantic, although all European Union countries showed increasing numbers of e-payments per inhabitant for the years 2002-2006 the actual variations between countries were very large. [62] The use of cash seems to be decreasing at only 2 or 3 percent a year, implying a long period of coexistence of old and new payment mechanisms. Indeed, British banks tried but, for a political decision, ultimately failed to stop the clearing of checks in 2018.[63] Cash will remain significant for many years, especially in the central and southern parts of Europe.

Business historians are already well aware that technology is not simply an economic input of which firms can consume more or less. Neither is it a deterministic force, dictating a single optimal organizational form for a given era. Arguments can be equally made that computer technology can lead to highly decentralized or highly centralized business firms. Indeed, technology can support efforts to achieve competitive advantage by larger or small firms. Historians must thus look more deeply to explain why applications of computer technology seem to have had little effect between 1960 and 1980 or indeed how they were instrumental in the resurgence in productivity since 1995.[64] Companies with the highest returns to their information technology investments did more than just buy technology; they reshaped their existing capabilities and invested in organizational capital (i.e. incentive systems, training and decentralized decision making) to create digital organizations.[65]

What is important, therefore, are the goals toward which organizations put the technology they adopt and the assumptions within which they invest it. These are, in turn, driven by a consensus within the

[62] Liikanen, "Electronic and Mobile Payments".
[63] "Checks will not be scrapped after all, banks say", *BBC News* http://www.bbc.co.uk/news/business-14122129 (accessed 03 August 2011).
[64] Brynjolsson and Saunders *Wired for Innovation*, pp. x-xii.
[65] *Idem.*

industry as to its future shape.[66] Mimetic isomorphism is at work not only when the actual innovations of other organizations are copied but also when a shared vision of historical inevitability and of the proper application of a new technology is accepted within an organizational field.

The vision itself is not deterministic, but functions as a legitimating resource on which historical actors can draw. As we have seen, the cashless-checkless society vision established a common end-point for bankers in the 1960s and 1970s, but they disagreed vehemently about the particulars of the route they should take to get there. Different actors struggled to define what they thought was the proper route, hoping to enroll others into their plans. Crucial steps in operationalizing and shaping the actual application of information technology to realize this vision were taken by middle managers, confirming their importance in the process of change not just inside individual firms but also within an organizational field as a whole.

Thus we argue for business historians to acknowledge and explore the ways in which technological expectations influence management discourse and in turn shape the institutional development of business. We believe that shared visions of historical inevitability, of future oriented knowledge, were often a crucial, and indeed neglected, factor in shaping the thoughts and actions of historical actors. Acceptance of these visions took place not just individually but also collectively, by industries and occupations. Once consensus on the future destination was reached a variety of specific systems or approaches could be presented as a step toward realizing this future goal, making the future a banner around which a heterogeneous alliance of interests could gather. When technologies failed to perform as expected this could be characterized as a bump in the road to the future, rather than as a challenge to the inevitability of eventually arriving at the agreed destination.

[66] Although business historians have debated the nature of the third industrial revolution, with the notable exception of Robert R. Locke and Katia E. Schöne (2004). *The Entrepreneurial Shift: Americanization in European High-Technology Management Education*. Cambridge, Cambridge University Press this discussion has been limited to the impact of applications information technology on the degree of centralization of business organizations as a means to contest the continuity and longevity of the Chandlerenian model of the firm