

Systems Integration

A Business Imperative

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A review of the evolution of information technology and its impact on business

Introduction

This report is a reflection of the many subtle and yet significant changes that have taken place within the business community and how technology has and continues to respond to these changes. A primer on the importance today of systems integration and how current business trends and technology have made it an imperative.



“No mere machine can replace a reliable and honest clerk.”

Remington Company, dismissing a new invention the “typewriter”



“Everything that can be invented has been invented.”

Charles H Duell, commissioner of US Patent Office, 1899



“Although it is an interesting novelty, the telephone has no commercial application.”

JP Morgan to Alexander Graham Bell

After working in the IT industry for 40 years allow me to offer reflections as to how business has influenced the information technology industry and vice versa. It should be noted, as illustrated in the quotes, that the future of technology is hard to predict and we may yet be surprised at how businesses choose to automate in the future!

Who Is Leading Who?

Is business driving technology and providing the impetus for technical innovation? Or is technology way ahead of the marketplace and therefore looking for “solutions” to fill?

Over the past 40 years of business computerisation, there are many examples of each! For example screen based word processing came out of left-field and within a mere decade typewriters and typing pools vanished. Wang Laboratories rose from a small factory manufacturing calculators in Massachusetts to become a US\$3 billion business in under 8 years.

On the other hand businesses in the 70's were screaming out for ways to distribute their information systems and driving technology away from centralised mainframes and with corporations such as Digital Equipment Corporation responding to this demand and achieving sensational success with the introduction of their PDP and VAX systems.

One more example was the original IBM PC... great technology but with minimal initial market acceptance until "killer" applications, especially spreadsheets, became available and cost-effective. Seems like a long time ago that the ultimate "accessory" for any chartered accountant was the "Compaq" luggable.



"I think there is a world market for maybe five computers."

Thomas Watson, Chairman of IBM, 1943



"Where a calculator on the ENIAC is equipped with 18,000 vacuum tubes and weighs 30 tons, computers in the future may have only 1,000 vacuum tubes and weigh only 1.5 tons."

Extract from the journal Popular Mechanics, March 1949



"Nor are computers going to get much faster."

Dr A Samuel, New Scientist 1964

Fundamentally the relationship between business need and technical capability has always fluctuated. However over the past 40 years there has been a number of distinct "eras" in business automation.

The Mainframe Era

Expensive, unreliable (remember the weekly preventative maintenance schedules), and with all information having to be coded, delivered, key punched, verified, and eventually processed at a central location. Error prone, batch reports, untimely data, but miles better than previous manual systems! Invariably the applications were designed and developed 'in house', with online systems and databases still way over the horizon. At least these systems developed into robust yet inflexible applications, but frequently handling only the mission critical financial applications as automating peripheral applications was seldom affordable.



"But what is it good for?"

Robert Lloyd, IBM engineer, 1968, commenting on the microchip

Companies employed their first ever EDP Manager

'He' invariably ran the computer department as an internal empire with projects often taking over two years to implement. The mainframe era was also characterized by IT being inward looking - seldom was any information received from external organisations and certainly none dispatched from the mainframe. The IBM computer became a corporate status symbol; a necessity for any upward mobile Fortune 500 President!

The Minicomputer Era

The glorious 70's! Smaller computers for less than \$1 million that offered batch and online capabilities, did not need machine rooms nor operators, and could be distributed throughout the business.



"We will never make a 32 bit operating system."

Bill Gates, Microsoft CEO, at the launch of MSX

The EDP Manager became the Computer Manager

No longer did the data have to be sent to head office, no longer were computers only available to the 'Fortune 500' major corporations, and no longer were an army of designers and programmers needed. Advanced programming languages such as RPG2 reduced development costs and timescales, but still no databases, application packages, nor networks.

Still usually punched card based and with the IBM System 3's, 32's, and 34's the most popular machines. Bulky 3271 type VDU's started to populate the offices, but still mostly batch processing. Whereas some data transfer was possible (long live 2780 protocols and 1200 baud modems), again computer departments remained inward looking.

The Server Era

With the advent of industry portable operating systems in the 80's, initially Unix, PICK, and subsequently Windows, minicomputers morphed into servers! The power of the Intel chip also brought the proprietary minicomputer industry to it's knees; no more Wang, Prime, DG, and many more.



"640K ought to be enough for anybody."

Attributed to Bill Gates, Microsoft CEO, 1981

This era coincided with the introduction of 'portable' relational databases and software application packages. Two major innovations that form the basis of today's industry. These factors made the impossible achievable and affordable. Now even small businesses could afford a computer system; fast, inexpensive, speedy implementation, easy to use, and offering managers quality real-time information at their desks. However the screens were still green, and inevitably you bought one 'integrated' package from your local software supplier and were totally dependent on them.

The Computer Manager became the Information Systems Manager

At last computers were talking to each other, and especially in America the concept of EDI established a presence with the major trading businesses, and "just in time" and "supply chain" concepts became business imperatives and therefore technology had to respond by networking disparate computer systems.

The Glorious 90's



"There is no reason anyone would want a computer in their home."

Ken Olson, President of DEC, 1977

The next quantum leap was the global software corporation! Almost overnight local software companies, unable to invest in future applications were absorbed by larger national companies who in turn were absorbed by global suppliers. In a matter of three to four years businesses such as Oracle, SAP and more recently Microsoft became purveyors of Enterprise or Supply Chain solutions, and grew to be billion dollar businesses. Amazing growth when compared to the 60 years IBM took to become that size. Whereas supply chain was supposed to embrace all business participants, seldom were there cost effective applications and services from these mega companies to automate all supply chain participants; however significant economies were often achieved at head office.

The Information Systems Manager became the Chief Information Officer

These substantial enterprise systems strove to cover all the bases, making it unnecessary for customers to look elsewhere for additional functionality. They also fuelling the growth of global IT consulting firms who were essential to make these multi-million dollar investments actually work well.

Client-server became a buzzword, with data distributed around the organisation, but invariably still running the same software. PCs, LANs, office automation tools, e-mail and Internet all emerged during this period to aid the effectiveness of business professionals and provide productivity gains to the vast amount of unstructured and local work that dominates all business operations.

Y2K

Bet you remember where you were on the night of December 31, 1999! Hopefully not at work praying that your computer systems were still going to function. However Y2K was a turning point in the industry as many businesses chose to discard their old legacy systems in preference to new packaged software and new ways of automating their businesses.

One massive change started to take place and became a paradigm shift. As a result of common databases, common operating systems, common user interfaces (Windows and Web), and the prevalence of PCs, the web and e-mail, it was now possible for the CIO to select a range of great applications and technologies from a range of suppliers collectively capable of best meeting the needs of the business. No longer was it necessary nor desirable to go to one software supermarket for a 'one size fits all' solution; the new millennium has made it possible to select an array of 'best of breed' applications.

Occasionally the CIO became the CEO!

The Emergence of Systems Integration

Quietly in the background a strategic demand arose for systems integration technology. The reason? To ensure that information was only captured once, was secure, errors eliminated, and that the information was able to flow between diverse applications within a business or indeed around the world. Based on sound business rules, such integration may be within a business, between trading partners, had be instantaneous, or actioned at predetermined times.

The ideal capability? For systems to be integrated regardless of the diversity of hardware, operating systems, databases, applications, and industry standards, both locally within an enterprise and globally between separate organisations.

Therefore new buzzwords such as EAI and middleware, combined with job titles such as Technical Architect, evolved to try and make everything work seamlessly.

Why Flow?

Flow has taken the approach that systems integration has to cater for the interchange of data at many levels:

- ✔ Between two or more applications on the same server
- ✔ Between applications on numerous servers within a business
- ✔ Between applications hosted by different businesses.

Flow software caters for all these needs. Within the confines of one organisation we use the term 'systems integration'. Between businesses we choose to retain the term 'EDI' or 'electronic data interchange'. Many of the capabilities and functions are identical; however EDI encompasses additional capabilities with regard to document formats, security encryption, telecommunications options, and adherence to the published standards of international bodies. Trading corporations are increasingly dependent on fully automating their supply chain with EDI the undeniable preferred way to go.

Great systems integration software needs to meet many criteria:

- ✔ It should be inexpensive
- ✔ It should be configurable to meet an extremely diverse range of business needs
- ✔ It should accommodate a wide range of databases, applications, and trading companies
- ✔ It should be easy & quick to install
- ✔ It should not rely on the need to invest in any additional technology
- ✔ It should be powerful to ensure that information is processed fast enough to meet business needs
- ✔ It should not require an investment in costly computer expertise to configure or run
- ✔ It should be capable of supporting both internal and external integration projects equally well.

The Next Era?

Definitely a complete reverse of the 60's!

Compared to the 60's: No fortress centralised computer empires. The information is captured and utilised directly by the workforce - wherever they are, whenever needed, and with whatever technology is best suited to get the job done. Portability is rampant with many businesses now downsizing head offices and having a mobile or at-home workforce.

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Compared to the 60's: When data was frequently weeks old when finally processed, it's the "now" generation. Immediacy is the norm, therefore a reliance on robust, portable, multi-functional, and easy-to-use technology able to work anywhere in the world 24/7.

Compared to the 60's: Whereas the mainframe computer room was the ultimate corporate status symbol, nowadays information technology and systems will be increasingly viewed as a utility, therefore being hosted externally and accessed from any device.

Compared to the 60's: Where you could process anything capable of fitting onto an 80 column punch card (sorry, Al Gore!), technology will capture and present information in any number of style and formats specifically tailored to the users skills and preferences.

Compared to the 60's: When most staff never saw the computer room, every worker is fully engaged in technology and consistently seeking ways to be more efficient and productive. Computer literacy is no longer a 'nice to have' option.

Compared to the 60's: Most CEOs are still striving to make their investment in technology and information systems into a strategic and competitive advantage; that elusive goal so essential in these competitive times remains an enigma.

The Future for Systems Integration?

Technology will continue to develop and improve be more powerful, flexible, portable, versatile, robust, easy-to-use and affordable. The need for information to flow both within organisations and the businesses that they engage with will continue to be an essential and vital requirement. Incomplete supply chains will no longer be an option; all suppliers and business customers will need to be fully engaged and automated.

Flow caters for the need to transform a diverse array of information systems into one cohesive integrated business solution. Whether intra-business or inter-business, workers and their organisations are having to work faster, smarter and more creatively to not just win but to survive.

The future for systems integration is significant. Either use the very best technologies for each critical area of your business and integrate, or go back to 'one size fits all'; an easy decision!

Flow Software's main objective is to provide leading edge integration software that gives our customers a competitive advantage, by enabling faster, smarter business results. Flow is an innovative New Zealand software company that specialises in designing, developing, and supporting middleware integration and EDI technologies. Operating from offices in Auckland and Sydney, Flow is utilized to undertake EDI with dozens of national traders and integrates seamlessly with all the popular accounting packages.

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