13 IT AND E-ARCHITECTURE – A TECHNOLOGICAL BREAKTHROUGH, A TECHNOLOGY RACE OR A NEW PARADIGM IN BUSINESS

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Abstract

The impact of Information Technology on the growth of the knowledge society is profound. In an era when human intellectual creativity is highly valued, IT is a powerful tool enabling the analysis and development of ideas and concepts. Systems that augment user capabilities encourage further exploration and foster creativity will enable users to do what they have not been able to do before. The synergy between IT and teams working together to accomplish mutual goals becomes the key to organisational performance. The AEC (Architecture, Engineering & Construction) industry in particular is undergoing dramatic changes due to the pervasive use of networked computers and multimedia equipment.

Our research focuses on IT and its impact on architectural team environments. Recent emerging trends that will be analysed include architecture firms collaborations on national and international projects (firms, experts in particular building types associate with local or regional firms called "architect of record" commissioned for the contract documentation and the contract administration stages of the project). Such trends necessitate the use of new technologies like advanced digital communications and hence the unprecedented boom of project extranets, or project WEB sites, and the emergence of the WEB-based architecture. Highly sophisticated architectural environments are built around Intranets, Extranets, the Internet and Video Conferencing systems. This enables the integration of architectural design, business management, and team collaborations through computer technology encompassing all phases of a building's life cycle: from the traditional design and construction phases to automated facilities management and to the event of the building's eventual demolition.

Keywords: *Knowledge Economy, AEC Industry, Collaborative Architectural Design, Extranets, Teamwork and IT Synergy*

INTRODUCTION

Today we are living in compressed time. Our era is characterised by vestigial remnants of the Industrial Economy coupled with the last 20 years or so of the computer revolution, whose impact was no less dramatic than that of the last 300 years of industrialisation. In this transition period from the Industrial Economy to the Knowledge Economy, knowledge plays an increasingly important role and permeates all aspects of our business, private and social lives. Information technology was regarded as the main source of information in the Industrial Economy. The predominant approach to handling information was through its manipulation, analysis and ultimate utilisation. In the Knowledge Economy information goes through the evolutionary process of becoming knowledge. When working in this distributed, networked environment, we evolve this new world and our lives become inextricably enmeshed in the survival of our "nets" with all intended and unintended consequences of its evolution.

In this context, the biggest challenge becomes the effective utilisation of this knowledge. Its impact on technology is profound and so powerful that it has fundamentally changed the way we do business and live. The market dynamics and the realities of our entire industry impose additional challenges that need to be well managed. Creating a competitive advantage and staying successfully in the race means working in environments replete with elements of unpredictability, increased tension and stress and a constant need to adapt.

This paper examines recent developments in the AEC (Architecture, Engineering and Construction) industry due to the pervasive use of the Internet as a management tool. The concept of collaborative teamwork emerges as a result of the evolution of email and the Internet enabling professionals to share ideas, thoughts and real projects on a global scale. An interesting implication of this global collaboration is the realisation that real-time work is substituted by virtual work, accommodating people's different working patterns thus improving overall performance. Special emphasis has been put on the New Zealand building industry examined through a series of interviews based on a specifically designed questionnaire aiming at establishing the current situation.

THE AEC (ARCHITECTURE, ENGINEERING AND CONSTRUCTION) INDUSTRY – FROM THE STATUS QUO TO WHERE WE WANT TO BE

The traditional business paradigm operating in AEC is characterised by relentless competition and lack of understanding the benefits of cooperation and "co-opetition" between firms. When analysing a relatively small construction market like the one in New Zealand, this competition for jobs becomes even more fierce and ruthless. The trend toward cooperative ventures and establishing collaborative work relationships is growing exponentially determined and at the same time facilitated by the changing nature of construction offering new opportunities. Understanding, adapting and utilising the abundance of these new opportunities and challenges creates a premise for the establishment of long-term and ad hoc teams working on a national and international level. The new generated synergy between such teams working together to accomplish mutual goals is a result of the organisational evolution and operational features of the firms involved and is a clear manifestation of the advantages gained from their combined resources. When information technology is viewed in relation to this new created synergy, the multiplied result effect exceeds significantly the initial investments made. Teams and

information technology prove to be the two most important and complex developments in organisations today. The ultimate challenge that organisations of today face is how to maximise the potential benefits of these two extremely promising developments through exploring their interdependence and recognising the power of knowledge through its better organisation, management and application.

"With the technology and connections finally in place, we now face the truly difficult part of the virtual equation – the people element. Real groups are notoriously complicated. Anything that goes wrong face-to-face also goes wrong online, only faster and less gracefully. Going virtual is for most people a wrenching experience, both in adapting to new technologies and in adopting new behaviours and working relationships…The steps that teams take to cope with their network nature – using collaborative technologies and designing flexible organisations – not only compensate for capabilities lost, but also establish the basis for extraordinary performance" (Lipnack & Stamps, 2000, p.7).

In general the building delivery process encompasses several distinct phases starting with the building initiation (project scope, land availability, financing and project timeline) resulting in the next phase – the design phase characterised by the transformation of the initial client's brief into a set of graphic representations supported by construction specifications. The role of the tendering and construction phase is to turn the contract documents into physical reality. Online bidding is a growing trend representing a powerful e-commerce entity.

"Businesses are getting excited about a process called a 'reverse auction'. In simple terms, a reverse auction is where a tender is posted on a website and bidders are invited to join an online auction at a specified date and time. A time limit is imposed on the auction and when the time runs out, the lowest bidder wins the contract" (Construction Manager, 2000, p.25).

Investment bank Goldsmith Sachs believes that B2B (business-to-business) trading, which includes project intranets, can work for the construction industry and can save between 5-35% (Construction Manager, 2000, p.25).

Facilities management is the last phase in this cycle involving the maintenance and proper operation of a building through evolving, linking and updating the alpha-numeric and graphic databases to maintain an accurate measure of various aspects of the building like human resourcing, asset management, house-keeping, environmental control, maintenance scheduling, etc. Traditionally different parties are involved in each one of these functional phases, a fact contributing to a certain amount of fragmentation in a relatively standardised process. This is especially true in New Zealand exclusive of a few large Telcos. Integrated, single source automated facilities management remains an undervalued market and hence an untapped service opportunity. The segment of the market, however, that most architectural firms operate in is the design phase. As this segment is relatively small compared to the entire building delivery process, the "players" in such a small segment doom themselves to a fast-paced, intensely competitive market. The upstream positioning of the design phase in the business cycle of the building process creates opportunities for the parties involved in this phase (architectural and engineering firms) to influence and ultimately enter and control the other phases. Through an appropriate structure, the architect is in an ideal position to offer and contribute profitably to these services on behalf of their clients.

Frank Gehry's Guggenheim Museum in Bilbao, Spain is an example of the ability of an architect to actively participate and contribute to the other phases of the building's life cycle. The building, whose many forms are only possible as a result of computer technology, required the use of complex and relatively expensive mechanical design software for architectural design. The core of the program used (CATIA) is its ability to deal with polynomial equations rather than polygons as most architectural applications do, (parametrically or not) and is capable of defining any surface as an equation. Frank Gehry's consent to adopting this sophisticated level of "design" technology did two things for the architect and the design process. Firstly, in the design phase, the software allowed unresolved gestural moves in sketches to be translated into 3-Dimensional forms and then to a large-scale model. Secondarily, this was a harbinger to the industry as a whole, demonstrating that Gehry, the architect, assumed greater control, acting as a "Master Builder as well. He was then able to contradict contractors' and manufacturers' claims that his sculptural shapes could not be built.

Incorporating design/build services with facilities management is an interesting trend to define a building through its entire life cycle in a more comprehensive way. This covers not only the traditional design and construction phases of a project but also property management and maintenance and even the building's eventual demolition. The use of IT through designing systems that augment user capabilities is conducive to mastering and perfecting such an undertaking. Future software packages suggest the scenario that

"a single, unified data model will encompass all the information about a building, from its initial programming through all the phases of design and construction. It serves as an aid to maintenance and operations and even covers the building's eventual demolition.
As the building evolves, the model grows richer in information added by architects, their consultants, and the constructors. This data includes the graphic representation of the building's form, numeric results of engineering analysis, text-based material specifications, project schedules, cost calculations, and more" (Novitski, 1999, p.1).

During the design development stage multiple software packages offering a selection of tools for forming spatial layouts would be a must. As design progresses into the production of the contract documentation (graphic) and specifications (alpha-numeric), links may be inserted between various symbols on plans, sections and elevations and building product manufacturers' WEB pages. Information from Exterior and Interior Finishes Schedules may be linked to relevant manufacturers' WEB pages as well. Parts of the drawing's cross sections may be linked to manufacturers' standard assembly details, the advantage being that they will be always the most up to date, complying with the latest technologies, building products and prices.

Sketches remain an inseparable part of the design process leading to a set of preliminary design drawings and ultimately to contract documents being posted to a project website together with e-mail, photographs, minutes of meetings, cost calculations, and progress updates. Such project websites (set up through the use of commercial WEB portals like Buzzsaw, Citadon or your own) can be viewed with any Internet browser. All project participants having access to the same website can use the information posted and add their own to the same building model.

From a client's point of view the advantages are in the close monitoring of the project at any time. Facilities managers would refer to the same model gathering information about Compliance Schedules (automatic fire protection equipment, lifts, signs, emergency lighting and ventilation plant) for issuing the annual Building Warrant of Fitness, building refurbishments and furniture ordering. "This centralisation of information would help improve communications between disciplines and reduce conflicts. Although most of these individual functions are theoretically available now, nowhere are they integrated into a single, streamlined package" (Novitski, 1999, p.2).

Today's normative condition is demonstrated in the process of completing The Rose Center for Earth and Space in New York, designed by Stuart Polshek. Although not as reliant on CAD in the initial phases of the design as the Guggenheim in Bilbao, the Rose Center, still, could not have been designed without the use of CAD, or other now requisite graphic and alphanumeric applications and databases.

During its design and construction, at least eight distinct computer models were created, each model describing different attributes of the same building. While not emphasising individual, applications or proprietary processes, an analysis of the collaboration reveals appropriate management and good decision support processes relative to the use of high technology. The project reveals achievements (team building in its own right) as a study of the dynamic synergies and how teams, long-term and ad hoc contributed to concessions resulting in the eventual cohesion between almost ruthless and competing interests.

The project was ideally suited for the use of multiple portals for data exchange (extra, intra, etc.,) or a single web-site. The first computer models (1994) predated the use of the WEB for project collaboration and were never employed.

The investment alone in information technology for the Rose Center was staggering. It was revealed, as the third costliest component of the enterprise's overhead. During the six year project, Polshek Partnership upgraded it's CAD software three times, went through three generations of PCs, upgraded it's network infrastructure, converted from Novel NetWare to WindowsNT, implemented new E-mail systems and changed the network filing system. The resulting chain reaction affected all consultants working on the same project. This approach to computer technology necessitated the co-existence of young computer savvy architects with highly proficient manual detailers.

Forming teams between architectural firms on a national and international level is acting as a major factor in easing the move toward the global approach to the building delivery process. The increasing complexity of projects with regard to both phasing and technology requires the involvement of different specialised organisations because of their expertise in a particular field and even more integration between multidisciplinary services. The operational context in which such teams function is characterised by recent developments in information processing and telecommunication technologies, global procurement of materials and equipment, and internationalisation of financial markets. Architectural firms experts in particular building types act as "design consultants" and associate with local or regional firms called "architect of record" commissioned for the contract documentation and the contract administration stages of a project. The collaboration with local firms is essential for understanding local markets in terms of

technological advancements, specific building practices (in New Zealand, for example, the extensive use of timber in the building industry), regulatory controls (the Building Act 1991 and the Resource Management Act 1991 in New Zealand). The formation of such alliances on an international level helps to avoid significant investments in a foreign country, resulting in significant financial savings and improved efficiency. A significant shift of attitudes toward the entire building process is inevitable: from a production-oriented culture dominant in some architectural firms nicknamed "factories" to a professional services culture inherent to firms that present themselves as a conglomerate of consultants offering professional expertise. The Royal Sun Alliance Building, Metropolis Apartments, Botany Downs Shopping Centre, DFS Galleria (all in Auckland,) are some New Zealand examples of international collaborations with the design coming from the USA and Australia and Auckland firms commissioned as "architect of record".

One of these examples – Botany Downs Shopping Centre was designed by the architectural practice of Altoon + Porter, headquartered in Los Angeles with a large presence throughout the Pacific Rim, acting as the "design consultant" and Hames Sharley – the New Zealand counterpart, acting as the "architect of record". Some of the key principles embodied in the business relationship philosophy and quoted by Altoon + Porter can be summarised as follows:

- You should never try to go after international markets until you have created a profitable local business.
- Working internationally is tricky but not impossible. Regardless of communication technologies employed, relationship building and delivering on promises remains the cornerstone to profitable ventures.
- Bring to your international customers products and services they can't find locally; establish local strategic alliances and deliver. Allow the local firm to play the lead role. Although the licensing process is the first reason to set up a local relationship, it is technically the least important to have local presence.

A future trend is for such joint ventures to expand dramatically and become even more frequent due to a total globalisation of the construction market in which the demand and supply of construction related services is no longer bound geographically. Opportunities for new projects will increase significantly both nationally and internationally creating a more intense competitive environment. This now requires on the other hand changing the competitive strategies of design-build-property management firms. The globalisation and the internationalisation of the construction market is a trend driven by a progressively decreasing demand by highly developed economies (for example Europe and North America) and a continuously growing demand by developing countries (African and certain Asian economies). The successful exporting of services in the construction industry becomes a necessity for national economic growth rather than an obsession with creating a modern image of a firm. International organisations heavily subsidise construction projects in developing countries (Zimbabwe, Botswana, Mozambique, Zambia, Malawi, Angola, Kenya, Tanzania, Nigeria as well as Vietnam, Cambodia, Bangladesh etc.) providing the financial resources and the professional expertise.

TEAMS AND THE HI – TECH OFFICE ENVIRONMENT

Who are the winners in such a highly competitive market? As the whole world is in a state of constant flux, businesses that lead, anticipate, and benefit from these rapid changes in many cases become tremendously successful. Others that are unprepared, surprised, or overwhelmed, find themselves falling behind their competitors sustaining major losses and ultimately going out of business. Complacency with familiar long-established systems and procedures is one of the reasons companies to fail. Becoming too comfortable with the current organisational culture and the way the company functions seem to act as a drawback toward a more modern structure. Uncritical acceptance of the status quo should not be tolerated. It is the management's role to determine whether the practices they have put in place bring the desired results and if not, must be prepared to make whatever changes are needed to guide the organisation to improvement and success. New advanced technologies and new concepts of people management come into being thus increasing productivity, enriching the workplace, and stimulating creativity and innovation.

Firms entering a foreign market have several options – opening a local office in a foreign country, collaborative work with a local firm on a particular project through a joint venture or a combination of the two. The third option proves to be the most promising and flexible one overcoming the disadvantages of the other two. Developing in-house personnel, slow organisational building, recruiting experienced professionals and sending them to a foreign country are some of the drawbacks associated with establishing local offices in foreign countries. The joint ventures have also disadvantages that need to be considered – a possible clash of interests, conflicts in joint project management due to a different organisational culture, future use and application of a newly gained knowledge especially in the realm of new technologies and advancements. When local and foreign firms enter into a business relationship for a short period of time, the assessment of the eventual gains and losses becomes something inevitable. Such collaboration might be perceived initially as beneficial for both parties and considered as a threat for one of them at a later stage.

Establishing a long-term relationship between business partners to pursue mutual goals, to share resources and technology, to contribute equally and to share rewards and benefits is a trend winning more recognition in the context of the increasing globalisation of the economy. The benefits can range from access to local markets and avoiding the necessity to invest time and resources in researching local government regulations to more exposure to outside technology and expertise enabling the undertaking of more challenging projects that otherwise would not have been considered. Another positive result of such collaborative work is the enhanced reputation of each firm involved broadening at the same time their cultural and technical background.

IT – AN ENIGMA CHALLENGING US OR A POWERFUL TOOL IN TODAY'S MODERN BUSINESS?

As collaborative work and team formation becomes a more pervasive trend, then the integration with computer technology becomes a high determinant factor for competitive advantage. "The ability to collaborate with anyone anywhere, supported by digital communications, is key to the success of a small firm with big ideas" (Novitski, 2000, p.2). The new generated synergy between information technology and teams enriches the organisational body of knowledge

resulting in an improved overall organisational performance. "Information technology can make teams more effective. Teamwork is essential for organisational success. If teamwork is the key to effective organisations, information is the key to effective teamwork" (Mankin, Cohen & Bikson, 1996, p.6).
The high performance of any firm depends to a great extent on the level of integration between teams and information technology. The synergy between the latter creates a platform for organisational change aiming at facilitating their better functioning within and outside the organisation.

"Achieving high levels of organisational performance requires the integrated development of information technology, team structures, and the overall organisational context. The development processes should be interrelated so that designs in all three areas will be mutually reinforcing" (Mankin, Cohen & Bikson, 1996, p.10).

The implications for AEC, in particular, are in the use of networked computers and relational technologies, multimedia, Video and WEB conferencing adding a new dimension to the complexity of the work. The first introduction of computers in the architect's offices in the 1980's has come a long way from the first PCs used as word processors substituting typewriters and computer aided design in place of drafting pens. This automation of the office environment created the premise for the rapid development of digital communications – a totally new way for managing information. The shift from paper media including fax, mail, and couriers to electronic media based on Intranets, Extranets and the Internet is basically a shift from the traditional way business was done to a new paradigm in business. The emerging e-architecture creates a premise for successful collaborations on national and international levels. "Web-based architecture must facilitate and document long-term collaborations among multiple players in the design industry" (Laiserin, 1999, p.1). Using the new technological advancements to do the same things in a better way looking for incremental gains only would be an oversimplified approach to information technology. Adopting the approach of the "helicopter view" to look at the big picture and put things in perspective would mean exploring new horizons and broadening existing concepts thus embarking on new initiatives. We live in a new age that is the electronics age with twenty-four- hour, seven-day workweek (24/7) that never stops around the globe. Collaborative work on international level means working around the clock, around the globe.

THE GROWTH OF THE PROFESSIONAL THROUGH THE AEGIS OF THE COMPUTER

What is the physical environment of the modern architect's office and why is it important? The office environment makes a powerful statement about the value the firm places on the quality of work. Office layouts can say more to an outsider trying to decipher the culture of a particular organisation than promotion articles, fancy WEB pages, mission statements and other artifacts. Architecture is about expressing yourself and finding your identity. A positive work environment fosters collaboration and the free flow of immensely creative ideas while a poor one will act as an inhibitor and an energy drain – a team is only as strong as its weakest link. It does not necessarily take a *feng shui* philosophy (based on the connection between physical environment and energy flows) to design an effective and efficient office layout. Physical surroundings have the ability to communicate loudly espoused values, underlying basic assumptions and management attitudes.

The modern architect's office has a wide selection of hardware items – PCs, fax machines, printers, plotters, photocopiers, scanners, digital cameras and even video conferencing facilities, artistically arranged in spacious open-plan office layouts. The software packages in common use are countless – CAD for producing 2D and 3D models (AutoCAD, ArchiCAD, Vectorworks, formerly known as Microstation, DataCAD,etc.), 3D Studio VIZ and 3D Studio MAX for generating 3D images and quality rendering, Photoshop and Paint Shop Pro for photo compositions through photo manipulation, Page Maker, Page Mill, Desktop Publisher, Illustrator for concept design presentation.

IT (MS Office, accounting software, E-mail, front and back office applications) is also used in the administrative management of the office reducing secretarial costs realizing at the same time that replacing one type of worker with another one, usually means the addition of a worker with different (back office) skill sets. The World Wide Web is extensively used for research with browsers like Microsoft's Internet Explorer or Netscape Navigator originally developed to explore the Internet. A further use of these Internet browsers is through their adaptation to Intranet usage with the advantage being of using a common viewing device for both external and internal information. Most large offices in New Zealand are built around Intranets and the Internet. "Collections of browser-accessible information inside an individual firm are called Intranets" (Laiserin, 1999, p.1). Some architectural and engineering offices in the category of the high flyers (Beca Carter Hollings and Jasmax for example) go even further and embark on using Extranets or project Web sites, for national (Auckland Hospital, Wellington Stadium) and international projects (Lion Nathan's Brewery in China). The introduction of the Extranets based on Internet related technologies is one of the most dramatic and significant developments for the AEC industry within the past 2-3 years. "When two or more separate entities – some combination of client, architect, consultants, and contractors, for example – share browser access, the underlying collection of information is called an Extranet" (Laiserin, 1999, p.1). These project Web sites function as a repository for drawings (saved in a .dwf format), specifications, reports, contracts, memos, and meeting minutes (saved in a .pdf format), and site photos (saved as .jpeg files). Everyone involved in the project after entering his password can view, download or upload documents using the same Internet browser. Clients can view drawings even without having CAD software on their computers through the use of an application viewer with the ability to pan and zoom across the files and control the visibility of layers in a drawing and redline them as well as use the Acrobat Reader for viewing documents saved in a .pdf format. Clients can also take advantage of the on site Web camera for monitoring construction progress, although the data gathered from interviews with industry professionals in New Zealand show that clients still prefer to read hard copies of meeting minutes and flick through a set of drawings costing thousands of dollars instead of pulling all this info off the Internet. The use of the extranets is not that common in the AEC industry in New Zealand, there are some psychological barriers that need to be overcome and they involve not only the clients but also some of the project participants who would still prefer to resort to something "safer" to use as the phone and fax machine or the Email with attachments rather than immerse themselves in the unknown world of the intangible. Web conferencing and Video conferencing have not yet been seen as an alternative to the traditional face-to-face contact in meetings. Internet Relay Chat (IRC) and Multi-User Dimensions (MUDs) are two programs that facilitate real-time communication over the Internet. Adopting this technology and moving it forward to profitable usage has forced some clients to stop responding to faxes and phone calls.

Being conversant with the IT technology is another challenge that architectural firms face.

" In an increasingly technology-dependent work environment, many architecture firms find a growing portion of their capital budgets given over to computer-related expenses. While buying hardware and software are the most obvious, costs for supporting computer systems and training an architect to take full advantage of a variety of computer applications may exceed hardware and software outlays combined" (Broatch, 2000, p.114).

Overreliance on IT on the other hand should be avoided, as IT is just another tool changing the way business is done but not necessarily a panacea for solving universal problems and definitely not a substitute for talent. One example of the different approach to business is the Internet-based project management (taking place in the construction stage of a project). "In essence, Internet-based project management represents a structured, integrated, and scalable solution for coordinating people, teams, and projects" (Maitra, 2000, p.35). Such an innovative approach to project management does not imply in any way a radical departure from the traditional way of managing projects, it is simply an alternative that may prove more appropriate in certain environments – working on international projects, or involving more parties on a project. Various embedded specialized software packages make it easier activities pertaining to a project to be properly scheduled and rearranged. Project planners reveal the implications of site instructions, variation orders and delays to the project's completion date and the Defects Liability Period.

RESEARCH OUTCOMES AND CONCLUSIONS

Our research methodology encompassed an array of primary and secondary sources of information – literature review, international case studies and projects both pre and post IT revolution, interviews with experienced industry professionals, hands-on experience demonstrating WEB based concepts in practice and individual professional expertise.

Information Technology has brought numerous changes to the AEC industry. The predominant approach to design and the construction process as a whole has undergone a radical shift to a synthesis, overlapping professional expertise with technological advancements. Although argued in literature that computer-aided design is "just another tool", and that "the initial process and the final results are basically the same" (Novitski, 1999,p.1) recent architectural examples exemplify the usage of computer technology in the creative phase of the design process. The amount of quality architecture being designed may not necessarily increase. However, if properly managed, it becomes an effective design tool. It should be regarded as a means to an end, not an end in itself.

The changing nature of our business imposes additional technological demands requiring continual upskilling in managing technological tools in order to conform to the business practices of the global economy. Therefore business and the construction industry as a whole need to align themselves more closely with educational institutions and develop strategic partnerships. Academia is in the unique position to act as a driver and remains the evolutionary environment fostering creativity, communication skills, and critical thinking. Additionally academia has more time and resources to experiment and is not at the mercy of the vendors' vision or how

technology can or should be used. It is academia that drives innovative uses of technology not industry.

The pervasive use of computer technology creates the basis for team collaboration (long-term, virtual and ad hoc). As business models flatten, managers need to adopt a more pro-active, vigilant role in managing their teams. Managers must also realise that computing is in a never-ending flux. This change, for better or worse dynamically drives the way we do business. The entire industry must seek out these changes, create them, challenge them, foster, adopt or discard them to suit.

Technology cannot be regarded as a substitute for talent. Mediocrity does not necessarily evolve to excellence due to the availability of sophisticated software. Let the experts do what the experts do.

CONCLUSION

"A competitive world has two possibilities. You can lose.
Or, if you want to win, you can change".

Lester Thurow
Dean, Sloan School of Management, MIT

Developing a continually high performing organisation requires changes of old habits, practices and thought patterns that people feel comfortable with. Losing a safe and familiar situation and moving into strange and unknown environments might mean a possible loss of values that are currently meaningful to the organisation. Detaching from the past and overcoming resistance to change become important factors in the process of change. As change is an ongoing process, managers and employees should get used to the attitude that things are never perfect and can be improved. The impact of technology networks on organisations is tremendous creating an enormous potential of teams to improve organisational performance through the effective use of information technology. Each individual in a company should become a source of new ideas and improved methods encouraged and processed by the management eventuating in new decisions.

The culture change is not a static situation. Whatever a given organisational culture is today, it will not be the same tomorrow. Although the goals set at the beginning of the process have been accomplished, there is no room for complacency. Remaining at the peak of effectiveness means that updating and revisiting the corporate culture is a must as changes in technology, changes in marketing and changes in interpersonal relations will continue to be made.

"To succeed, it is necessary to accept the world as it is
and then rise above it.

Michael Korda
Publisher and Author

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