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OPEN SYSTEMS TECHNOLOGY AND THE TRANSFORMED
BUSINESS ARCHITECTURE - THE
ACCOUNTING SYSTEMS PERSPECTIVE

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ABSTRACT

Within today's corporation, IT managers are increasingly incorporating open system standards into their technology infrastructures. The resulting more open, flexible IT infrastructures create a platform or technology foundation that enables the implementation of new application architectures, enterprise-wide integration of diverse functions of data and applications, and most significantly, the integration of new information technologies into the reengineered organisational architectures.

In manufacturing, open standards are pervasive and the implementation of new-generation open, applications software called MRP II, or enterprise resource planning software, have had far-reaching implications for the manufacturing function, as well as contributed towards transformational organisational performance in terms of time to market, innovative product development, cross-functional performance, improved quality, etc.

Drawing a parallel with the manufacturing experience, this paper explores, for the current generation of open architecture, Unix-based financial accounting applications software, if this has also been the case for the accounting function. It discusses four cases of organisations, all leaders in their respective industries/sectors in some detail, measuring the benefits of the systems that were implemented in terms of their organisational impact. Finally, it reviews the findings for the current-generation Unix-based accounting software in the light of the new generation of open-architecture accounting software that are currently taking off in the wings.

INTRODUCTION

Competitive Advantage and Organisational Transformation. Based upon groundbreaking management research conducted into the likely impact of the business environment upon management styles and organisation structures in the 1990s, the MIT Sloan School of Management [5] predicts that business organisations in the 1990s will need to address issues such as - the need to rethink the core of their business and to develop bold new business visions; to reengineer management and key processes; to evolve new networked organisation forms and teamworking linked by the information technologies; to accept the changed nature of work in the information age, and of the strategic impact of electronic networks and integration beyond the boundaries of their business organisations in the context of new business alliances; the use of such business networks to shift the strategic scope of their business; and the new role for organisational leadership given this context. A formidable challenge indeed for managing in the 1990s - one in which Information Technology will have an integral and integrative role, and open systems a foundational one - as companies in the US and the UK as well have discovered.

Open Systems Key to Flexible IT Platforms. British companies have already been gearing up the last few years to face the challenge of doing business in the new market dynamics of Europe 1992 and beyond. In marketing terms, business organisations will now need to address the new Europe as a single global entity/region, an environment quite different from that previously in which each country was treated as an individual market. Given these new business dynamics, many companies have discovered that they had to completely reorganise their hierarchically structured organisations and processes in order to transform their organisational performance, and to effectively compete in the new EC.

The business climate of new economic Europe is shaping the strategic vision and organisation structures of these British, and their European, competitors. These companies are also aware that to underscore their new organisation forms they will also need to be new, redesigned IS applications positioned upon a flexible, open IT infrastructure - "flexible" because given the current state of flux in implementation business organisations
were unlikely to be able to adequately predict what doing business would really be like in the new EC, nor what type of IT applications such a future will bring.

The bottom line appears to be that, as businesses prepare for the 1990s and re-engineer their business architectures in order to become more customer-oriented and to improve their competitiveness in terms of time to market for product innovations, and new service levels, they are actively repositioning their IT infrastructures upon an open standards backbone.

**ENTERPRISE COMPUTING AND OPEN STANDARDS**

Business transformation involves not incremental change, but major change on many levels at once [3]. The contemporary literature [1, 3, 4, 5] suggests that the process begins with the articulation of the business vision by executive management - this is a vision of how the company should be run in the twenty-first century - that is then used to drive the design of the new or transformed business architecture. The new business architecture in turn provides the basis [4] for specifying the IT architecture that will support the strategic thrusts of the business.

The IT infrastructure is the platform upon which the IT architecture is developed. Being the shared or common part of the IT architecture (21), the IT infrastructure needs to be open and flexible so as to support the cross-functional integration of existing automation, to support the rationalisation, simplification, and reworking of existing business processes, and to support the additional layers of new technology that are essential to competing effectively in the marketplace.

Open Standards: Today’s large computerised multibusiness enterprise that operates various information subenvironments that subscribe to diverse sets of proprietary standards. Every department of such an organisation presents a typical example of this problem of heterogeneous standards. Historically, such situations arise from stovepipe decisions taken in regard to IT resources in an earlier departmental computing era, when the focus had been on the functional pieces of the IT mosaic. The legacy today is incompatible processes, data, and technology, and the ultimate IS director’s/CEO integrator goal of seamlessly integrating and rationalising all processing and information resources across the enterprise, the vision of enterprise computing, continues to remain elusive. The world of information systems and technology, in terms of common standards, is quite unlike that of telephone’s, television’s, or broadcast radio’s, where common standards have existed for a good number of years.

The 1990s however promise to be a decade of significant progress for open systems, for systems that are built upon public (non-proprietary) operating systems, user interfaces, application standards, data and networking protocols. In the context of enterprise computing, several models of “open” systems, or seamless enterprise connectivity, may be gleaned from the research and professional literature. These may tentatively classified into vendor Enterprise Architecture approaches (e.g. Digital's NAC, NCR's cooperation, etc.) database vendors, data integration approaches, the outsourcing of system integration approach, the networking approach, the currently fashionable “middleware” approach, and finally two enduring approaches most commonly associated with the term Open systems, the Unix or non-proprietary operating system standards approach (and upon which this paper will focus), and the data communications standard, OSI. These latter two models are discussed briefly as follows.

The Unix Movement. Recent past years have seen encouraging progress for Open Systems. The process of standardisation is now well advanced especially on the systems software front - and Unix, after a slow start - is now a major feature in computer industry developments. The operating system has become the standard multi-user OS for small to medium-sized minicomputers, and there is now available a substantial third-party commercial applications base - including that for accounting software. Virtually all hardware vendors offer Unix today, and for all practical intents and purposes, the OS has arrived.

OSI Progress. Closely related to the Unix developments, in the data communications arena are the standardisation moves in the telecommunications arena, where ISO’s OSI scheme has also made significant progress, as reflected in the recent release of an almost real OSI standards-based software packages. In the meantime TCP/IP continues to hold the de facto connectivity standards fort.

The operating system standards and telecommunications standards areas aside - database standards, hardware and peripheral interface standards, and user interface standards, as well as those standards in other facets of information technology are also enjoying unprecedented acceptance.

**Vendor Enterprise Architectures and Technologies.** Of the various models of enterprise computing, the most workable model is that as presented by major vendor enterprise architectures like NAC, New Wave, and Cooperation. The underlying concept presented in the various major products is basically similar - distributed processing among many different systems within a common, integrating environment. At present such enterprise architecture products are proprietary, however with the maturing of open standards and as more and more products are data communications’ based on both open and proprietary platforms, we are increasingly witnessing a higher degree of overlap, or commonality, of standards, and a gradual opening up of the vendor architectures.

New Applications Architectures. These new integrating more open-architecture computing environments, including the vendor environments, are host to a variety of contemporary technologies as client-server computing, dis-
ttributed databases, heterogeneous access standards, data repositories, networks and data communications, E-mail, network management, and standard hardware interfaces.

Within the business enterprise, such technologies have laid the foundation for a new applications architecture - client-server computing - for a new generation of IS applications. Such new-generation business application software (such as that in manufacturing) take advantage of the new, more open vendor enterprise architectures and of their enterprise technologies as itemised above in their basic software architectures.

Given this scenario, there are interesting implications for traditional "stovepipe" applications as accounting's and human resources management's, amongst others. But before getting into that it is worthwhile to first take a leaf from the CIM/manufacturer experience, where new-generation manufacturing software have begun to transform organisational performance in U.S. manufacturing corporations.

APPLICATIONS IN AN OPEN SYSTEMS ENVIRONMENT - The Manufacturing Experience

In its heyday, U.S. manufacturing enjoyed profitable product life-cycles of four to seven years and scant competition from overseas. The situation was no different in Europe. Today's sobering reality is intense global competition with product life-cycles of less than two years; time-to-market is crucial, and cost, price, service, and quality pressures are enormous. Given this scenario, companies have taken a new look at how they work, and many have concluded that the survivors of tomorrow will be manufacturing enterprises that have developed flexible management and information structures that are capable of quick action and response.

Integrated Manufacturing Systems. Information in such enterprises will be gathered and rapidly distributed throughout the manufacturing process and beyond - to be made instantly accessible to product designers, manufacturing engineers, shopfloor supervisors, sales and marketing personnel, executive decisionmakers, and even customers and suppliers. Such capabilities call for the implementation of a highly automated flow of computerised information between people and applications, and the integration of technologies as diverse as workstations, personal and mainframe computers, controllers, barcode readers, robots, sensors, etc. (and all frequently from different suppliers), into enterprisewide networks.

New-generation Software. Already, a new generation of manufacturing ERP II software called enhanced MRP II (Manufacturing Resource Planning) or ERP (Enterprise Resource Planning) systems are being introduced that make enterpriseswide data sharing possible. Many of these systems will run within available enterprise architectures as B/S and B/S, and because of the high demand for open architectures, they will increasingly operate on Unix platforms as well. Typically they incorporate client-server architectures, GUIs, RDBMS with SQL for ease of use, and also technologies as multiple database support, 4GLs, front-end and end systems for decision support, automated EDI, inter-operability with multiple platforms, product configuration management, CAD integration, multiplant MRP, and standard APIs.

Manufacturing Transformation. Made up of as many as 15 modules in some instances, these enterprisewide applications are effectively enabling new, horizontal customer-driven processes to be developed using a combination of management techniques like concurrent engineering, JIT manufacturing, TQM, and business process reengineering (BPR). The result has been leaner organisational forms, team-based decision-making, and order-of-magnitude benefits in the areas of customer service, product delivery, cost, and quality.

ACCOUNTING SYSTEMS IN THE OPEN SYSTEMS ENVIRONMENT

Whilst a major IS mission may be to achieve highly integrated systems in the manufacturing area, over in the accounting function highly integrated systems are nothing new. Accounting is a highly information-intensive area and has traditionally been the first function to be computerised in the business enterprise.

Current-generation Accounting Software. The current generation of accounting software installed on minicomputers and mainframes reflect this heritage. They are stable and comprehensive, having been conceived and developed, mostly on proprietary platforms, in the 1980s or earlier, and they share a common functionality in terms of performing the basic accounting functions. How such current-generation systems have seen considerable enhancement over the past few years and are already so packed with features that little room is left for further development.

Unix-based Accounting Software. The available Unix-based accounting software share many of the stability characteristics of this current generation of accounting software, as well as much of their functionality, but they possess additional advantages of portability - being able to operate on anything ranging from desktop architectures through large minis; of the Unix superior multi-tasking abilities, of online capabilities in some cases, and of the more contemporary technology features - GUI-like interfaces and RDBMS-based 4GLs. These lattermost features are reminiscent of some of the characteristics of the latest new-generation Accounting Systems, or what are being impatiently heralded as "the Accounting Systems of the 90s" (see final section).

The Contemporary Literature. The new-generation Manufacturing systems running on open infrastructure-enabled applications architectures such as client-server platforms, GUI interfaces, and RDBMSs, etc. have featured in order-of-magnitude organisational changes.

The available contemporary literature (Hammer[8], Andros et al[16], and others[14, 20]) on reengineering the Accounting function
have identified benefits as dramatic improve-
ment in transaction processing time, improved
customer service, and considerable reduction in
manpower, a reorganisation around the reen-
gineered processes, simplification and
elimination of many of the old procedures, and
their deployment of emerging technologies as
networking, imaging, and CASE, as well as
increased front-end functionality that en-
powered frontliners to increase the scope of
responsibility undertaken.

The classic example is that of the Ford Motor
Co. 's accounts payable system. As Hammer[8]
recalls it the top management at Ford, in
common with many major organisations at the
time, had major cost-cutting measures and
downshrinking/outsourcing forced on them, which
causen them to reevaluate and to reengineer
decades-old processes employed in their
respective businesses. Some of the affected
processes at Ford included traditional accoun-
ting processes like accounts payable and
accounts receivable.

Ford was able to drastically redesign its ac-
counts payable procedures and to achieve
staff reductions of 75% in its accounts pay-
able area - from 500 staff down to 125.
Mazda's efforts have even been more spec-
tacular, and they manage with only 5 in their
accounts payable departmen.

Major common characteristics and issues asso-
ciated with such and other documented exer-
cises were that the redesigned processes were
cross-functional, they were customer-
oriented, their deployment called for the
formation of a cross-functional team with
committed top management support, and their
development called for the application of a
(BPR - Business Process Reengineering/Re-
design) methodology. Such issues, amongst
others, had to be taken into consideration in
undertaking a successful BPR exercise.

Conventional Accounting. On the other hand
the benefits of conventional accounting
automation are associated with the familiar
benefits of productivity/efficiency improve-
ment, and are well-documented in the tradi-
tional, and easily available, IS literature.

THE STUDY

Presently a new wave of accounting systems,
similarly-endowed as their new-generation
manufacturing cousins, are waiting in the
wings. Are they likely to achieve, or to help
contribute to the higher order of their
magnitude organisational changes? Also how
good are the present generation of Unix-based
accounting software?

Local Application. The local data processing
situation is presently at that stage where a
significant number of installations in the
"Unix-based" market, i.e. those organisations
using hardware in the mini- to mid-size com-
puter range, are experiencing the need to re-
place their aging hardware. Numerous such in-
vitations have been reported as having
migrated to Unix-based computers, where they
proceed to run the current-generation Unix-
based accounting softwares alluded to ear-
erly.

The purpose of the study was to ascertain the
type of benefit realised by implementing the
existing generation of Unix-based accounting
systems, and the impact of such systems upon
the host organisation structure at various
levels.

Methordology. Four major organisations, all
leaders in their respective industries or in-
dustry sectors, were selected for study. A
three-part questionnaire was used as basis
for interviews that were initially conducted
over the telephone, and followed up with
field visits and more detailed interviews
with IS managers/senior IS personnel and key
system users. Mini case studies of the four
organisations are cited in the next section.

Questionnaire Construction. The first section
of the three-part questionnaire contained
open-ended questions of a general nature
designed to establish the organisation's
business background and its technology and
applications environment, whilst the second
and third parts contained the key applica-
tions and organisational impact questions.

The second and third sections were prepared
on the basis of a search of the conventional
literature (as discussed in the previous sec-
tion) for the characteristics of the benefits
relating to the automation of conventional
operational-type (accounting) applications,
as well as of the contemporary literature
(also see previous section) for characteristic
of the benefits of the BPR-type applica-
tions respectively.

In the former case, the traditional charac-
teristics associated with the conventional
calculating benefits model have been well docu-
mented in the available literature (Wetherbe' s
PIECE framework, Senn's Five Cs, and
miscellaneous others). Building the
characteristics for the BPR benefits model in
regard to the latter (third) section was more
challenging, and these had to be drawn from
papers by Hammer[8], from available case
descriptions[14, 16, 20], as well as the BPR
literature[1, 17].

The second section also comprised questions
that examined - given that the accounting ap-
plications were of the conventional opera-
tional and management control-type automation
- if their implementation had any impact upon
organisation structure at individual,
departmental, or organisational-wide level. The
third section in like fashion contained ques-
tions that probed for evidence of benefits of
BPR-type applications, and similarly assessed
their implementation impact on organisation
structure.

Findings. From the organisations' response to
the questionnaire, the benefits of implement-
ing Unix-based accounting IS were then
categorised into one of the two benefits
categories discussed above (i.e. conventional vs.
BPR) and the impact of implementing these
systems on organisational structure assessed.
These findings are discussed at length two
sections on.
Example #1. A large statutory board successfully downsizes its payroll application for over 1,000 employees from a proprietary, stand-alone mainframe onto a Unix workstation, following which the application is integrated into the organisation's other accounting software that is resident on other mainframes supplied by a major vendor. The operation is highly successful, report the users, having achieved benefits of simplicity of operation, increased functionality, and reduced operating costs. Reasons for the migration were twofold — the replacement of a dated, batch-oriented application with a superior, more flexible one; and second, which was a deliberate decision to position the new application onto a more open platform so as to achieve a seamless integration with the other accounting applications resident in the main network. The new system would plug into the organisation's large local area network, and overcome the interfacing problems of what was previously two incompatible platforms. Now the application may be accessed from any authorised workstation within the net. Further, its Unix platform assures future portability, scalability, and ease of software enhancement.

Example #2. The second example is that of a large publicly listed organisation dominant in its industry and enjoying a turnover of around $200M per annum. It currently operates a dated, large mainframe that runs financial accounting and related applications. The IS manager has recommended migration from the mainframe onto a midsize minicomputer Unix-based platform. The organisation is operationally dependent upon a number of operational legacy accounting systems written in a 4GL, and that have been progressively refined over the years to suit the corporation's style of business. Recently the 4GL vendor has announced the availability of the Unix version of the 4GL with migration tools, thereby potentially easing the transition to the new hardware platform. In the process of deliberating the downsizing scenario, the considerations that have figured in the decision include: significantly improved platform economics, the continued compatibility with a fairly large number of existing PCs, the option of rewriting the existing applications in a client-server architecture with user-friendly graphic interfaces, and the long-term benefits of the move away from proprietary architecture to a more open IT infrastructure.

Example #3 is a leader in the local warehousing and transportation industry. A year ago, it undertook a major IS planning exercise, as a result of which a decision was taken by senior management to develop in-house IT infrastructure based upon open standards. It subsequently replaced its old minicomputer with a new Unix-based mini, and purchased Oracle/CL-Oracle database software to replace existing batch-oriented accounting systems. The new package provided for online file processing, and was subsequently enhanced to improve the customer handling aspects. An existing PC LAN was also linked into the new mini, to allow downloading of files and data exchange. The migration exercise has resulted in more tightly integrated systems, ready access to on-line data, and reduced monthly running costs. The main benefits, however, of moving to a more open environment will only materialise in the long-term future. Switching to the new accounting software is pretty much transparent as far as the new operating environment is concerned. There have been benefits of on-line processing, and much is expected of the underlying RDBMS capability as users gain increased familiarity in future.

Example #4 is the world's leading international air courier company, which deliberately committed to a worldwide IT strategy based upon open systems in 1986. Reasons for the decision include scalability — the new systems being developed for the Unix environment will run on microcomputer, workstation, and various minicomputer platforms worldwide — a particularly significant factor for its fast-growing Asian offices; and connectivity — a strong communications infrastructure for information transmission forms the backbone of the company's international business. The Unix decision provides for distributed, realtime processing across a centrally-managed X.25 net.

The organisation has gone through a significant learning curve with Unix, and the transition is now well advanced, including Singapore's which is the organisation's Asian office. Software migration strategy comprises the ongoing development of new strategic systems on the open platform, as well as the porting (also ongoing) over of existing critical operations, and implementing applications as they are developed or acquired, as in the case of packages.

The projected benefits of using new accounting software under the Unix environment include those of online processing (vs. the existing batch-oriented processing), integrated systems, higher productivity (using RDBMS-based software can be linked to e-mail, spreadsheets, etc.), user-friendliness, improved information availability.

FINDINGS

All the organisations surveyed currently operate, with the exception of one that is in the process of converting to, the current-generations accounting softwares in their new open Unix machine environments — new in the sense that none of the machines had been installed more than two years ago. In all cases, with one exception, the organisations had either outsourced the development of their software, or had purchased ready-made packages. The language of development in almost all instances was a RDBMS-based 4GL. All the four had significant IS departments given this class of application (human resources, HR, and staff strengths ranged from the eighteenth for three of the installations, with the fourth a large statutory board — having a central IS staff of at least double the latter count. In terms of business sales and turnover, these organisations fall in the
medium-to-large business category, i.e. 350K - 300M per annum, with the exception of the latter (statutory board) organisation which is entirely public service-oriented. All are conventionally structured organisation-wise, and although each is distinct in its industry, none is reputed for any particular innovation, and their collective management styles were probably more indicative of good, solid rather than innovative, management.

Summary of Results. In terms of computerisation impact, there have been in all instances benefit, or projected benefit, in migrating to accounting systems running in a Unix environment. The benefits are those of downsizing, of economics, of improved management information and control, of improved production of or enhanced connectivity and of more highly integrated systems in terms of data-, process-, and systems resource-sharing, and of improved user-friendliness.

The characteristics of such benefits as realised by these organisations are more in line with those that are associated with the traditional model of automation – i.e. conventional benefits – rather than with the order-of-magnitude-type benefits that have been associated with the BPR model and those cases documented in the literature (so with those associated with the new-generation manufacturing software). In terms of impact on organisation structure, as would be expected therefore, they have been limited mainly to impact at departmental level and to the individual worker.

This could be due to a number of factors, noticed in commonality in the four organisations surveyed, and these are drawn out in the rest of the section.

High Levels of Conventional Automation. One possible explanation is that in all cases the current-generation accounting software had merely been deployed to achieve a high level of automation of the traditional clerical processes in the organisations studied.

Absence of BPR-type Approach/Methodology. Benefits in terms of order-of-magnitude (10X) or of transformational-type change were not witnessed, unlike the case with the new-generation Manufacturing software. In none of the organisations has BPR methodology been adopted. Although all projects were supported by top management or at least by a steering committee, in project proposal studies no view of improved business organisation that drove the project was evident, and although interdisciplinary teams were involved in the study, and cross-functional system improvements planned, these were mostly at an operational level. Consequently any conventional benefits/returns, not significant (tenfold) improvement, had been targeted.

Comparison of these findings with the BPR benefits/issues model of the sections earlier indicate that both BPR-type tools as well as methodology need to be available in order to effect the kind of dramatic change associated with organisation transformation, consequently the mere deployment of even state-of-the-art Unix software will be unlikely to realise such change.

Awareness of the BPR concept amongst key IS personnel ranged from limited to well-informed; however wherever the latter was the case, the intention to pilot at least an IT-enabled BPR-type project in the near future was mentioned.

Cross-Functional and Interorganisational System Capability. In the study, none of the accounting systems studied (including order processing and receiving systems) cross business functions and achieved improvements as spectacularly, nor do they have the ability to integrate into IS that do. The packages that are employed were of the conventional accounting applications variety and without cross-functional capability. Also, unlike the cases in the literature, they possessed limited (20i) or no 106 capability.

Unix-based Accounting Software. This is reflective of the still-limited functionality of some of the Unix-based Accounting software that is in use today. As pointed out earlier, a good part of the current-generation Unix accounting software comprises software that has been ported over public feature upgrades, from the era of proprietary mainframe/mini operating environments. Such software will boast the strengths of a mature and proven product – characteristics like stability, support, and compatibility accounting capability. However they also retain many of the limitations of the earlier generation.

On the other hand a good number of Unix-based accounting software, especially the more recent packages, have been written to take advantage of the open Unix platform – consequently they reflect 4GL heritage packages that are RDBMS-based, have on-line processing and query capability, display GUI-like frontends, and enjoy, the superior performance and portability/interoperability advantages of being Unix platform-based.

However such capability, whilst impressive by traditional accounting software capabilities, pale beside those of the next generation of accounting systems.

New-generation accounting systems. The new generation of accounting systems, the "Accounting Systems of the 1990s", promise to make a more significant impact, going from reports in the literature. These software will likely be implemented, as their manufacturing cousins have been, within the concept of enterprise computing and in the context of business reengineering.

Will the new systems likely achieve the kind of transformation that we have witnessed in manufacturing? From a preview of the literature this certainly appears to be the kind of capabilities that the new generation software has been targeted at. This is borne out by the type of added functionality that have been built into these packages.

THE OPEN ACCOUNTING SYSTEM MODEL OF THE 1990s.

The new-generation accounting systems will likely be open, capable of operating on a
number of platforms, client-server based, and operate within Enterprise Computing environments - most likely Unix-based - like their cousins in the manufacturing area.

Features to Look For. According to a Computerworld report [6], these future Accounting systems will sport GUTS, function within a client/server architecture, operate in multiple languages, possess BPR features for improving in-the-minute operational data, and support multiple accounting languages for global business operations. They are also likely to be current-generation systems and possess imaging capabilities.

BPR Feature. Of the new features previewed, potentially the most exciting is the BPR feature. BPR features, when they are delivered in the new-generation packages, will be easy to understand and simple to implement. For companies who are familiar with BPR, the new-generation packages may allow them to implement BPR features in their organizations. For companies who are not familiar with BPR, the new-generation packages may provide a framework for implementing BPR features.

Data in Realtime. The experience with most of today's mainframe-based (and thus batch-oriented) accounting systems is that information is not available on a day-to-day basis. This means that managers cannot make decisions quickly. The new-generation systems will allow managers to make decisions quickly and on a day-to-day basis.

Other User Issues. Realtime processing capability aside, other issues likely to be future are the downsizing (or rightsizing) of the IT investment, the vendors of the accounting systems of the future, and the "computer-aided Accounting".

Downsizing issues will continue to figure on the cost-saving agenda, and as users push for quicker access to accounting data, more and more organizations will consider downsizing their mainframe applications to open, microprocessor-based and LAN-based platforms. Moving such applications to such open environments will create opportunities to introduce new RDBMS-based technologies and user-friendly GUI interfaces.

Migration Issues. Much has been written about the "painless" move to open systems, in the course of which numerous migration models have been offered. A key issue is that of existing large investments tied up in legacy systems. In the manufacturing area, vendors of the new-generation software have offered existing users of their current-generation MRP II software alternative migration options to the new, more open systems. It might well be that new-generation accounting software vendors will also offer similar migration service to their current-generation accounting system users.

The vendors of the accounting systems of the future - there are conflicting views whether the accounting systems of the 1990s already exist. Leading-edge vendors claim that such systems are already on the market, while other vendors say they are still some time away.

CONCLUSION

While current-generation accounting software appears to have achieved limited impact on the business enterprise, the emerging open systems are altering the competitive landscape. Accounting software vendors are altering the competitive landscape, the competition for market share continues. The next 10 years are likely to be a time of radical change in the accounting software industry.

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