Bringing strategic efficacy to facility management through CAFM tools

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Abstract

Most larger companies and corporations who own or lease multiple locations face challenges in designing, tracking and managing property. The following case study examines the work of the Facilities Design and Planning Group at Dow Jones & Co. The study follows the group’s efforts to improve the strategic efficacy of its operations by expanding its implementation of its computer-aided facility management (CAFM) system and by developing some novel CAFM tools. These technologies are intended to reduce management costs by creating a central and comprehensive resource of facilities information. Both facilities professionals and those seeking facilities-related information can then use this resource. These tools support day to day facilities operations, from master planning to project design and budgeting, from construction to lease management. Such
technology increases accuracy through data validation, but remains flexible in reporting and inquiry. This paper documents both the evolution of these tools, and the decisions that guided their development. It aims to describe in detail the particular business circumstances that influenced Dow Jones' efforts as well as expose the setbacks in using and expanding various aspects of the technology.

Keywords:
CAFM, standards, data integration, data transfer, data validation, electronic project management, interoperability, electronic CAD archives, company churn

INTRODUCTION

21st century facilities challenges
Dow Jones & Co., like many large international companies, possesses a wide portfolio of properties under lease and ownership supporting its operations. In the last four years, Dow Jones Facilities Design and Planning (DJFP) has devoted considerable time, effort and capital in creating and implementing electronic tools that promote a more strategic approach to the acquisition, analysis and planning of its facilities.

Few people truly know much about Dow Jones & Co., although the name Dow Jones is cited almost every day in the reporting of financial news in the USA and around the world. The name Dow Jones of which most people hear is the Dow Jones Industrial Average. This index of 30 blue chip American stocks has tracked the pulse of the US Stock Market and distributed this information in real time since 1896. The company today is the pre-eminent publisher of financial and business news, distributing its reporting through print, newswire, television, radio and the internet in 19 different lines of business. In over 120 years in business, Dow Jones & Co. has not only built a broad spectrum of media products, but has also expanded its corporate presence into a network of office and press printing locations, connecting more than 80 North American locations and 60 international sites.

Although the total employee headcount is not staggering (approximately 7,000 employees in 2004), the number and diversity of locations, high technology requirements and trend towards 24 hours a day, 365 days a year global work environment has presented many design challenges for those working in the management of Dow Jones & Co.'s facilities. The three main areas of challenge for Dow Jones FM are:

1. fast and accurate reporting tools for real estate statistics
2. decreasing cost and development schedules for construction and relocation projects
3. accurate depiction of company assets: space, employees, furnishings and equipment.

**CAFM at Dow Jones**

Although the employees of Dow Jones & Co. are widely distributed throughout the world, the management of all North American real estate and facilities occurs from a single US location in Princeton, NJ. Dow Jones, as a corporation, has been fairly progressive in the last 15 years in recognising and employing facilities technology in the workplace. Electronic computer-aided design (CAD) archives and computer-aided facilities management (CAFM) tools have allowed the DJFP department to recall building data quickly and accurately for projects of relocation, new construction and disposition. These tools unite an extensive archive of drawings and database information documenting some 3.5 million square feet of space in North America alone.

Until 2000, these software applications primarily functioned to maintain base building architectural and engineering information, to track utilisation and cost of space by department, and support the corporate DJFP staff in working with company churn and expansion. In 2000, a project to master plan and consolidate the Information Technology (IT) department on Dow Jones largest corporate campus lead to the realisation that the DJFP group would need to expand its toolset to address broader aspects of master planning.

From late 2000, the DJFP group embarked on a multi-faceted effort to make the design planning process at Dow Jones more strategic. The main business objectives of this effort were:

1. **standardisation**: creating a standard allocation of space to staff
2. **data collection**: developing a process of collecting programming information that would be uniform, complete and strategic, and delivered through a user-friendly electronic interface
3. **electronic project management**: building an electronic process of managing projects, which would enable distribution of project data to the project team in real time; use electronic tools to consolidate information sources and electronically record all important project information
4. **data integration**: uniting the planning information collected by DJFP with databases maintained by the Communications group (networking/telephone information) and Human Resources (HR) (employee/department information).

**Standardisation**

The standardisation of individual staff space was the objective completed first. Standards were formalised following a corporate benchmarking study of cross-industry space allocation. The final recommendations included two sizes of open plan workstations, for professionals and managers, and two sizes of closed offices, for
divisional executives and corporate executives. One goal of this work was to provide a planning template for space forecasting and analysis by drawing a mathematical relationship between required personal workspace and headcount. The second goal of the standardisation effort was to minimise non-standard furniture inventory and foster a ‘plug and play’ type work environment. The expectation was that standardising the work environment would save the incremental move reconfiguration costs. Eliminating workstation and office reconfiguration would simplify moves to involve only contents and personnel. With a fair level of churn throughout the company and reassignment common, especially within the News and IT divisions of the company, workspace standards would quickly show benefit to the company.

Data collection
The second objective was to improve and standardise the collection of programming and asset information. Initially, DJFP tried to use a software solution with minimal customisation. This solution used a Microsoft Word programming document and required manual input of the results into the strategic planning application within Dow Jones’ existing CAFM software. The intent was to leverage the database and statistical reporting capabilities of CAFM to analyse the projected space needs for a five-year planning forecast. Dow Jones worked with Integrated Data Solutions (IDS), the FM technology consultant, to customise the existing application to account for the specific asset types the company wanted to quantify.

The initial programming sheet was similar to most programming documents used by consulting architects and planners. The DJFP group believed that, if the document was in a common word processing format and available and returnable by e-mail, the remaining statistical work would be simple. Despite the efforts to make the document easy to complete and return, DJFP met resistance with the intended respondents. End users complained that the forms were too long or just did not respond fully or substantially. Respondents were not readily able to identify their current inventory, much less define or recall their needs for support space, personnel or equipment. Moreover, they simply could not forecast growth or contraction in requirements. Perhaps the greatest blow to this programming pilot was an extensive reorganisation of IT management structure during the collection of data. With department staffing, relationships and contents in flux, it was impossible to stabilise the programming information or build the database of assets intended. Under the pressure of a tight schedule to move from programming to block planning, the integration of the programming information with the existing CAFM system had to be set aside for this project.

Although the test project did not provide the type of reporting envisioned, DJFP did make strides towards a more strategic
Streamlining project communication through document consolidation

The group succeeded in creating a prototype for an electronic programming tool that documented the count of staff, equipment, furniture and support areas tracked over time. In addition, DJFP succeeded in setting the groundwork for the CAFM application to translate asset counts (people, space, equipment, etc.) into a report, which projected required floor area, and DJFP discovered that a portion of the programming document made an excellent tool for staff relocation information. The programming sheet for personnel data, used in table or spreadsheet format, provided an excellent basis for consolidating all move information for particular individuals. This document, and the variations which succeeded it, provided a mechanism for merging programming data with move and networking data which previously appeared in separate documents. As a result, three documents became one (see Figure 1), streamlining project communication.

Project management
During 2000–2001, the DJFP looked at a few different solutions for electronic project management. Unfortunately, most of the applications on the market really seemed more apt for the complexities of large-scale construction. At the same time, Dow Jones, like many other companies in this period, started shrinking with the recession and cutting expenses. The number of projects funded at Dow Jones in this period became few, and this
technology was not seen as a critical expenditure. Therefore, DJFP re-examined the department’s current technology and started looking to adapt e-mail and other enterprise-wide applications to distribute and track critical project documents.

**Data integration**

The weakening the American economy in 2001 put an end to the seemingly continuous corporate expansion seen by Dow Jones since the early 1990s. As a consequence, interest in master planning and growth strategy lessened in importance. This drove DJFP to focus its efforts toward design and construction activities, supporting department reorganisations and other small construction projects.

During this period, DJFP initiated some inquiries into sharing company data with other departments. One goal of this effort was better to assess vacancies in space and suitability of space to particular departments. The HR department agreed to provide a quarterly feed of staffing information. This feed supported two important tasks for DJFP: early headcount analyses for proposed projects, and recording of company allocation and chargeback calculations. More importantly, this HR feed became a vital tool in assessing facility occupancy in remote sites, where designers often worked on projects with limited field visitation.

A second component of this data integration was linking staffing information with network infrastructure delivered to workstations and offices. With Dow Jones & Co.’s core business relying on the distribution of information in real time, the ability of staff to have the proper network architecture was fundamental to bringing all Dow Jones’ products to market. Variation in the network availability, port density and connectivity played a considerable role in planning and moving staff to different locations. Furthermore, network parameters greatly affected move viability, delivery time and cost. Different buildings had differing network infrastructure, software and connectivity requirements. Similarly, each line of business had different needs and expectations of the network infrastructure required to support its operations. Facilities Design and Planning believed that combining such network information with other asset data could benefit both Facilities and IT staff. Dow Jones’ IT division did not agree with this viewpoint. It felt uneasy about providing information across departmental boundaries and expressed concern that such integration could compromise IT’s existing database. Current technologies generally allow multiple departments to share data without any loss of control or corruption of the original data source. Nonetheless, DJFP could not reach agreement, and the project proceeded without an IT source data. Facilities Design and Planning still believes that such integration provides value in the programming and selection of property. It remains an open issue on DJFP’s task list for future development.
CAFM SYSTEM OBJECTIVES AND DEVELOPMENT PHASE 1

Once the key business objectives were delineated, DJFP set about working with IDS to specify how the CAFM system would be developed and implemented. The key point of departure in improving Dow Jones’ strategic planning process was improving the collection of data. Facilities Design and Planning focused on automating, standardising and ensuring integrity in the collection and analysis of strategic space planning data. The following list details the technical objectives for the Strategic Master Planning (SMP) application:

- common format for collecting and distributing project requirements
- scalability of the system to any size project
- development within the existing database software application
- development of a project life cycle tool
- development of a single data source for facilities information
- allowance for comprehensive and uniform initial collection of information
- electronic request record and distribution mechanism for project information
- requester accountability
- streamlining of project documentation and maintenance of record database information
- widening the information available to project team without duplicating files or efforts.

SYSTEM DEVELOPMENT

Dow Jones’ existing CAFM software provided a comprehensive strategic space planning tool, but did not integrate inventory collection with the analysis and reporting required to serve as an architectural programme. Given the specifics of many of the business objectives of the project, the existing system needed to be modified. The required modifications included adding architectural programming inventory capability and adding circulation factors at several levels.

The system had tools to inventory people and room standards as assets. It was then modified by adding an entry form (see Figure 2) to inventory equipment and storage elements also as assets. An area factor for circulation was added at the asset level, the department level and the floor level to account incrementally for non-core circulation space. The net asset area plus the circulation factors were summed to both the department and the floor totals. These totals provide both the current architectural programme area requirements and the forecasted growth of the space. This first phase development included four output reports: Summary Questionnaire, Detailed Questionnaire, Department Summary and Department Detail. Illustrations of these forms appear in the ‘Implementation and solution’ section of this paper. No reports documenting architectural
programming were created in this phase owing to a lessening business need. Nonetheless, the programming structure and calculations developed in the system were completed, laying the foundation for the creation of such reports at a future date.

**HISTORY CHANGES TECHNOLOGICAL NEEDS**

The year 2001 would prove a watershed year for Dow Jones & Co. The first eight months of the year were quiet with the company downsizing, with retrenchment in the US economy curtailing most construction. Cost saving measures curtailed all but the most critical of facilities projects. By Labor Day, 2001, the implementation of the IT master plan, begun in 2000 in Princeton, was in its final relocations.

At the World Financial Center, the company’s second largest single site, in Lower Manhattan, the last phase of renovation work for the ever-growing *Wall Street Journal* had come to completion at the World Financial Center. Facilities Design and Planning was enjoying an uncharacteristic lull in new work.

**9/11**

The events of September 11th, 2001, dramatically affected the work of the entire Facilities department at Dow Jones & Co. and created wholly new urgency for its strategic master planning efforts. Dow Jones & Co.’s corporate headquarters housed in seven floors of 1 World Financial Center, adjacent to the World Trade Center, would be first evacuated, then enveloped by debris showered by the collapse of the Twin Towers, and ultimately damaged beyond any notion of immediate occupancy. Figure 3 shows the North Tower’s debris enveloping 1 World Financial Center in its collapse. Dow Jones had contingency for power outages, but not for this type of construction disaster. 1 World Financial Center was the principal writing and composing site of *The Wall Street Journal*, Barron’s, Electronic Publishing and Radio units as well as the corporate headquarters. Although staff were safely evacuated, there was still news business to run and a daily deadline to meet.
Disaster gives impetus to innovation

The company’s disaster recovery plan, relocating publishing to the Princeton campus, was put in motion upon the evacuation of the Towers. This included a unique coordination effort to transport stranded Manhattan-based staff 60 miles south to Princeton and use training space as a temporary newsroom. A point of company pride continues to be that The Wall Street Journal of September 12th proceeded to press only one hour later than usual, despite the loss of its primary work site.

Aftermath

What was not known on that day, however, was the course of events that Dow Jones & Co. would endure. While The Wall Street Journal staff encamped in disaster backup space to meet their deadline on the afternoon of September 11th, the Department of General Services, the business unit which includes DJFP, worked to define and prepare an interim recovery strategy for 800 displaced staff. The initial strategy consisted of creating a newsroom for 200 staff and editors of The Wall Street Journal in mostly vacant space. Using empty workstations among existing IT staff, a newsroom for the Journal’s online edition sprang into existence. Using DJFP’s CAD/CAFM resources, DJFP evaluated the occupancy of existing buildings and identified where and how to increase workspace density and provide communications/electrical support. Logistics of the plan were discussed in a cross-departmental task team meeting in the early evening of the 11th. Preliminary plans for conversion of an initial 25,000 square feet of vacant space were issued at this time, and network and electrical infrastructure work started that evening. Purchasing ordered overnight shipments of additional computers, printers and other support equipment.

By September 12th, the level of damage to the neighbourhood surrounding the World Trade Center site precluded any thought of a speedy return to the World Financial Center.

Instead, planning efforts within DJFP shifted into high gear. Within the first week after 9/11, designs to redesign, reorganise and relocate 800 displaced staff among Dow Jones’ five metropolitan sites in Manhattan and Jersey City began. The Facilities Design, Purchasing and IT groups worked in concert to get each location built and networked.

In the last week of September, Dow Jones’ Senior Management team announced that the company would seek to rebuild only three
of the seven evacuated floors, reassigning some 350 staff to other metropolitan locations. The World Financial Center floors would be rebuilt, but not as they were before 9/11. A ‘Newsroom of the 21st Century’ was slated for development in shell office space in Princeton. The four-person DJFP staff was immediately tasked to programme and design these new facilities by early 2002. At the same time, the same team was expected to continue to plan and support the workspace requirements of displaced staff in the six other temporary work locations, and develop a renovation and consolidation strategy for returning to the World Financial Center. Out of these extraordinary circumstances and sheer necessity, the SMP system at Dow Jones began anew.

REVISING SYSTEM REQUIREMENTS: PHASE 2 STRATEGIC MASTER PLANNING

Business objective
After September 11th, only one essential business need existed: to perform strategic space planning for the 800 people that were displaced by the events of 9/11, quickly and inexpensively. Since Dow Jones’ Senior Management decided that 1 World Financial Center was not to be renovated to its former form, this was not a simple task. Although there was essentially a single business objective, the complexity of the redistributing staff meant negotiating many competing and conflicting requirements. Facilities Design and Planning redefined the project objectives towards specific tasks, which could be accomplished quickly and cost effectively. These objectives overlapped those initiated in 2000 for master planning:

— collection of inventory data
— adjustments to collected data
— growth forecasting
— adjustments to forecasts
— presentations to customers and executive management
— architectural programme for consulting architects.

SMP system requirements phase 2
Facilities Design and Planning had two additional objectives for this redevelopment of the SMP System. The group wanted not only to meet the specific project objectives stated above, but also to develop a tool that would set a formal methodology for project management at Dow Jones. The group also wanted to alleviate one of the most difficult facets of controlling a fast track project: clear communications throughout all the organisation and with contracted consultants. Facilities Design and Planning wanted to improve and to control the exchange of information between its team, other Dow Jones departments, consulting architect—
Defining the scope and the technical parameters of the solution

Engineering teams and Dow Jones senior management. The communications fell into three areas:

- collection and verification of inventory and growth projections
- distribution of a complete architectural programme to the consulting architects and engineers
- communication of all project information to the various planning and construction team members.

If the system was to fulfil its promise, it must allow DJFP to move data and other communications smoothly to all interested parties.

IMPLEMENTATION AND SOLUTION

The primary goals of implementing the SMP application were:

- to develop an easy collection tool for inventory and growth projections
- to create accurate forecasts with sufficient detail so that the space allocation plans were readily defensible
- to generate architectural programmes directly from inventory and forecast data and distribute them electronically
- to automate forecasting from inventory and projections
- to summarise data in many formats for different audiences and purposes: the audience included the occupants, management, senior executives, in-house designers and consulting architects
- to develop all data in a single database to minimise data entry and maintenance and to ensure data integrity
- to utilise the existing system to reduce development costs, data development costs and the time to implement the solution.

As a result of the first SMP efforts, DJFP knew that, conceptually, it was an advantage to re-employ existing CAD and CAFM resources. The CAFM database already contained statistical spatial information on all Dow Jones’ metropolitan area sites. In addition, the information had integrity, since the CAFM system validated all critical data. With information on space already available to a large extent, the time required in developing inventory was substantially reduced. The existing system also had many of the tools and reports needed to produce much of the required project output. The earlier strategic planning effort thus helped inform and focus the phase 2 endeavour, which was critical to meeting the goals of cost effectiveness and project delivery.

Initially, DJFP sought to implement the collection of information (department survey questionnaires) using the company intranet. Development of a new intranet process and application with the Corporate Web Development team, however, proved time prohibitive. As a result, DJFP sought to find a user-friendly interface that could be distributed via e-mail. Using e-mail would solve distribution and collection problems in the short term, and would be adaptable to future technology and long-term goals.
The existing CAFM software was then customised to take advantage of two new features offered by the software used by DJFP. These features were: import/export functionality with Microsoft Excel, and the integration with Visio for the development of department organisation charts. Excel was used as the platform to exchange departmental inventory and forecast needs. IDS restructured the Dow Jones Programming Questionnaire to collect detailed inventory data, sum the inventory into total current counts and then expand it into counts for three forecast periods. The same forms would be used to import the data into the CAFM system and to distribute the architectural programmes to the consulting architects. By using the same form for communicating with the departments as with the consulting architects, and treating the CAFM system both as the central repository and as a data validation tool, the effort to exchange data and maintain data integrity was kept to a minimum.

The phase 1 CAFM system was modified to accept expanded inventory data. Several new reports were generated to facilitate communication with all team members. Having a detailed inventory with circulation factors at multiple levels provided statistical support to projecting required areas. It also made the design parameters and constraints readily accessible to senior management. This contributed to reducing needless redesign time and expedited approvals.

Programming questionnaire forms
The programming questionnaire consisted of a general departmental information form and six forms for counting inventory of: employees (two forms), rooms, equipment, filing and storage. These forms were created in Excel for ease of distribution and for importing the information into the CAFM system.

Information from the questionnaire form feeds two transfer worksheets. These worksheets consolidated the information from the questionnaires into a format that reads directly into the CAFM system. Formulas and pivot tables converted questionnaire data into the exchange worksheets. Samples of these forms are shown in Figures 4–6.

Visio Departmental Organisation Chart
One of the two employee forms collects the reporting structure for all employees in a given department. Once this information is imported into the CAFM system, Visio can produce the Departmental Organisation Chart. The resultant organisation chart displays the true names of the employees. The example in Figure 7 was edited to show titles only.

Architectural programming reports
The questionnaire information imported into the CAFM system enabled the creation of a vast array of facility reports. Two levels
Easy to use forms bridging planning and programming

of architectural programming reports were produced: a summary of the information and a detail report showing all inventory items, their area requirements, and their circulation requirements. The CAFM system also combined the inventory items and the existing space information for each site. The summary report in Figure 8 illustrates the roll up of inventory information to an area projection for three forecast periods for each department in a specific location. This report would then summarise to give executives the overview of needs for all departments in any assigned location.

In contrast, the Architectural Detail Report (shown in Figure 9) reordered the programming data, as it would be useful to consulting architects and engineers. It differentiated specific levels

Figure 4: Questionnaire

Figure 5: Employee requirements
### Figure 6: Transfer worksheet

<table>
<thead>
<tr>
<th>#</th>
<th>Name</th>
<th>Position</th>
<th>Email Address</th>
<th>Phone</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>John</td>
<td>Manager</td>
<td><a href="mailto:john@sample.com">john@sample.com</a></td>
<td>123456</td>
<td>Note 1</td>
</tr>
<tr>
<td>2</td>
<td>Jane</td>
<td>Assistant</td>
<td><a href="mailto:jane@sample.com">jane@sample.com</a></td>
<td>654321</td>
<td>Note 2</td>
</tr>
</tbody>
</table>

### Figure 7: Visio department organisation charts

[Diagram of department organisation charts]
Collected data extracted into multiple report formats and analyses

SUMMARY
Building upon existing CAFM technology, the phase 2 SMP system, from survey forms to final reports, was designed, developed and implemented within six weeks. The short implementation time...
of the SMP system allowed the 9/11 relocation projects to take advantage of superior data collection and reporting technology without elongating the fast-tracked design schedule. The SMP system reduced the time to produce and distribute programming information and compressed the design development time line.

The benefits realised from the system were:

— time savings
— accuracy of data validation
— single data entry point
— tools for future projects
— form standardisation
— distribution of forms with existing infrastructure and standard software
— generation of move information
— comparison of projected space with programming requirements
— creation of a flexible data set for reporting and analysis.

The ‘Newsroom of the 21st Century’ in Princeton opened on schedule in the late spring of 2002. The Wall Street Journal reporting staff and Dow Jones corporate executives returned to a repaired World Financial Center in mid-summer 2002. By the close of 2002, all Dow Jones staff dislocated by 9/11 found permanent work environments. Data collected in the SMP application of the CAFM system was crucial to the timely design and delivery of all the new spaces and provided logistical support to the scheduling and detailing of staff relocations. The data were later recalled in the allocation planning activity and continue to be tracked for financial, planning and real estate purposes.

**Extending strategic planning**

The American economic downturn which started in 2000 continues to affect the strategic outlook and workload of facilities at Dow Jones & Co. Cost cutting and budget restrictions have trimmed the DJFP staff by 25 per cent, while the group’s responsibilities have actually broadened in scope. This workload has intensified the need for smarter and faster working, and for more automated processes and time-saving technologies.

Strategic master planning has proven an ever-evolving process at Dow Jones & Co. As DJFP attempts to align the support of planning, construction and allocation activities more with the overall company business goals, the group continues to broaden the reach and application of the collected data. In 2003, DJFP started to support larger real estate objectives by merging leasing information with existing building information. Much of the existing leasing data existed in an aging and non-validated home-grown database, targeted by Dow Jones Finance for retirement. IDS developed a translation methodology enabling the import of leasing information into the validated CAFM environment. In
addition, IDS expanded the field structure of the existing CAFM application to allow the particular mathematical recalculation of rentable areas as used by Dow Jones Finance. When complete, the system will use either leased area, CAD generated area or manually entered area information (in that default order) to calculate the space chargeback reports. This approach will not only fulfil Finance’s chargeback calculation requirements, but will also allow for both the system and the data to be developed over time as other regions are added to the database. This value of this approach will be realised as DJFP has been asked to unite the records of the international properties in Europe, Middle East and Asia with the existing CAFM system in 2004.

Integrating lease information into the system will lower the cost of technology, lower the effort to enter the same data manually in multiple systems, increase accuracy, expand analysis capabilities by combining leased and owned property information, and develop a stable and validated system for future integration with DJ’s new ERP system.

Facilities Design and Planning is constantly striving to improve its FM automation tools and processes. One example is a recent case study examining the value of interoperability for a reconfiguration project. The case study looked at the value of both three-dimensional modelling and attributed specifications in the construction process. The case study was developed by DJFP’s architects, engineers and technologists in order to assess the construction and life cycle benefits of interoperable construction drawings. The results of the study provided valuable information for improving the design, construction and project management of future projects.

LESSONS LEARNED
Although most facilities professionals recognise potential benefit in the vast array of facilities management technologies, implementing such technology requires careful consideration and planning. The tools selected must both adapt to the users’ needs and increase productivity. Facilities Design and Planning’s initial use of an ‘off the shelf’ software solution for strategic master planning was too labour intensive to prove of value, but the subsequent customisation of the same software, used in combination with a carefully planned data collection and transfer paradigm, proved highly valuable. Facilities Design and Planning found that the successful solution meant creating balance between corporate business objectives, facility management objectives and technology. This success was achieved despite the pressure of implementation during a time of particular corporate stress resulting from the consequences of September 11th, 2001. One of the great revelations of this work was that the users of a technology and the corporation, itself, both must embrace the technology. Users must understand the value of specific technologies to exert the effort for
process change. In turn, the more the corporation supports innovative technologies and processes, the more staff will be inclined to innovate and improve work processes. Facilities professionals, in particular, need corporate support to create trust and collaboration across departmental lines. Without collaboration, departments cannot realise fully the efficiencies of the common data formats found in current software technology.

In a business environment where real estate contracts and construction budgets are often set before a project even has a defined scope, strategic data tools can make the difference between a shot in the dark and an informed decision. Dow Jones & Co.’s strategic master planning efforts initially sought improved project process and emphasised asset tracking and building standards as a control mechanism for master planning. In its subsequent efforts, the company found that data collected for master planning could substantially improve project communication through the design and construction process, as well as support move coordination. Although the implementation returned a positive return on investment (ROI) for its intended project goals, using the data for business purposes not initially targeted has revealed additional benefit. Data generated for particular projects are benefiting facility managers in many contexts and across a variety of interests. CAD archives once used primarily for design activities and space charge backs are now tying into real estate and lease work. Construction projects are using standards to project space needs with greater accuracy, reduce costs and maintain corporate parity. Most significantly, DJFP’s success with FM tools has brought a positive regard for developing additional collaborative technologies for the company.

APPENDIX: GLOSSARY OF TERMS

CAFM
CAFM is an acronym for computer-aided facility management. CAFM refers to any software system that automates several facility management tasks. A CAFM system usually includes both a data and a drawing (CAD) component. A CAFM system can be composed of several different software packages or it can describe a single software system.

CAFM as defined by IFMA (www.irma.org)
CAFM computer-aided facility management: a high-tech tool used by facility professionals to track and manage virtually any facility-related asset. Provides managers and decision makers with the ability to analyse the effective use of space more readily than ever.

Standards
There are three types of standards referenced in this article:
1. standards applied to space
2. standards applied to alphanumeric and CAD data
3. standards applied to processes.

*Space standards* refer to typical sizes and layouts for offices and special purpose rooms (like conference rooms). An example would be a manager’s office is an 8ft 0in. × 8ft 0in. cubicle. And an executive office is an enclosed office 10ft 0in. × 15ft 0in.

*Data standards* refer to the consistency of the data. For example, all data are entered in upper case or all wall lines are drawn on a specific layer, and all end points at corners coincide.

*Standard processes* refer to processes that are carried out in the same consistent manner. An example that encompasses all three types of standards is the strategic planning questionnaire. This questionnaire is consistent in form and content, uses the same list of room standards, and was distributed, collected, reviewed and processed following the same procedures in each of 85 departments.

**Data integration**

Data integration refers to combining data from multiple sources into one location. Data integration has two components. One is the technical part of combining data, and the other is the human side of sharing information. The technical side addresses having two systems share data (interoperability). Some of the technical factors are common formats, software that can interact with each other, consistent data (standard references to the same information) and synchronised updates. Some of the factors related to sharing data between departments is ownership of the data, security, integrity and visibility of the data.

**Data transfer**

Data transfer is the exchange of data between two systems. This usually involves some kind of conversion, translation or data manipulation. One example was the use of a transfer worksheet to convert the data collected from the questionnaires into a format that the CAFM system could use. A series of formulae combined the data from several questionnaire worksheets into a single worksheet which was formatted for direct import into a single asset table in the CAFM strategic planning module.

**Data validation**

Data validation or valid data refers to data in a database that are matched against a list in another table. An example of this is a list of cities. There may be one table in the database that is a list of buildings. The data in the building list include the address. One part of the address is the city name. The city name is validated against the list of cities. If there is no match, the data cannot be entered in the system. There may be many tables that reference this one list. For example, a list of buildings, leases, employees,
companies, etc. may all reference the same list of cities. This ensures that every reference in the system to a given city is identical.

**Electronic project management**
Electronic project management refers to using electronic tools to manage projects. There are many tools available but, typically, managing a facilities management project using electronic tools requires the use of several different software packages including — project scheduling, project collaboration, document management, accounting systems, e-mail and corporate ERP systems.

**Interoperability**
There are many definitions of interoperability. This case study chooses the following: ‘The dynamic exchange of information among all applications and platforms serving the entire building community throughout the life cycle of facilities.’

Interoperable data are data that can be exchanged between two systems directly. There is an organisation devoted to developing interoperability standards for the AEC/FM community. It is called the International Alliance for Interoperability (IAI). Their website is: http://www.iai-international.org/iai_international/

**Electronic CAD archives**
Electronic CAD archives refers to saving the CAD drawing files that are received from architects and engineers in a common place (library) for reference. The drawings are typically construction documents that were used to build the space, and they should reflect what was actually built.

**Company churn**
Company churn is the measurement of the number of staff moves or relocations occurring within a year. It is also referred to as the churn rate. This rate is a ratio of the number of moves to the number of people employed by an organisation.

As defined by IFMA (www.ifma.org):

**CHURN: The total number of employee workplace moves made in a year, divided by the total number of office employees in that facility, multiplied by 100.**

**Links**
An excellent site where more can be learnt about FM and FM automation is www.ifma.org. Under the page titled ‘What is FM?’ are ‘FM Definitions’, ‘FM Acronyms’ and ‘FM Links’. Under the ‘Councils’ page, there are listings of all the Councils. IFMA has an ‘Information Technology Council’ (http://www.ifma.org/hosts/itc/) which is a good source for information regarding FM automation.